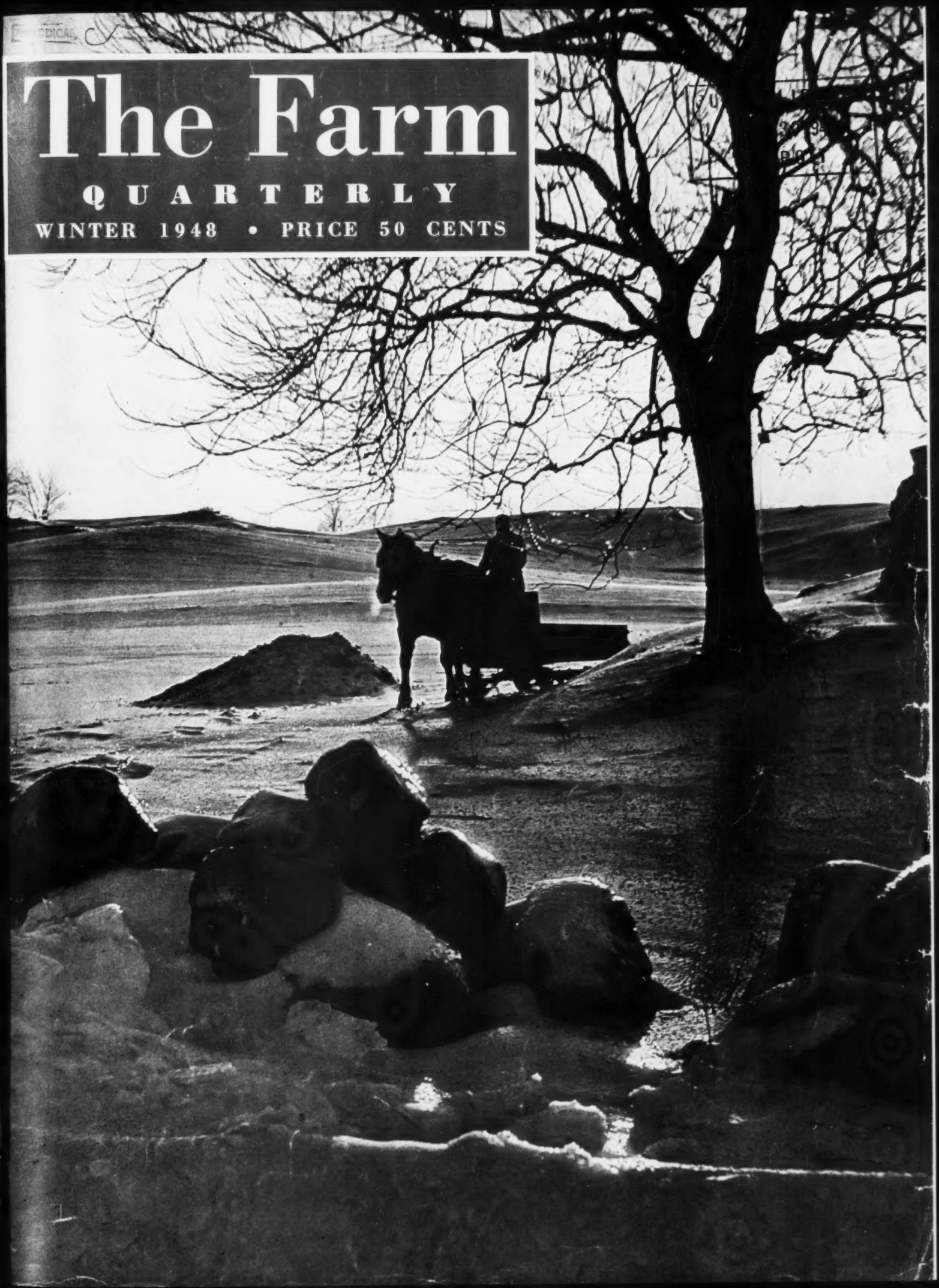
The Farm

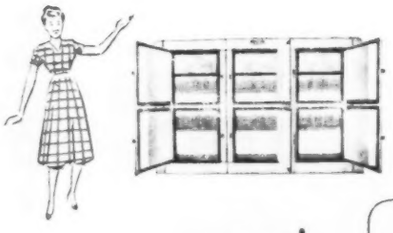
QUARTERLY

WINTER 1948 • PRICE 50 CENTS



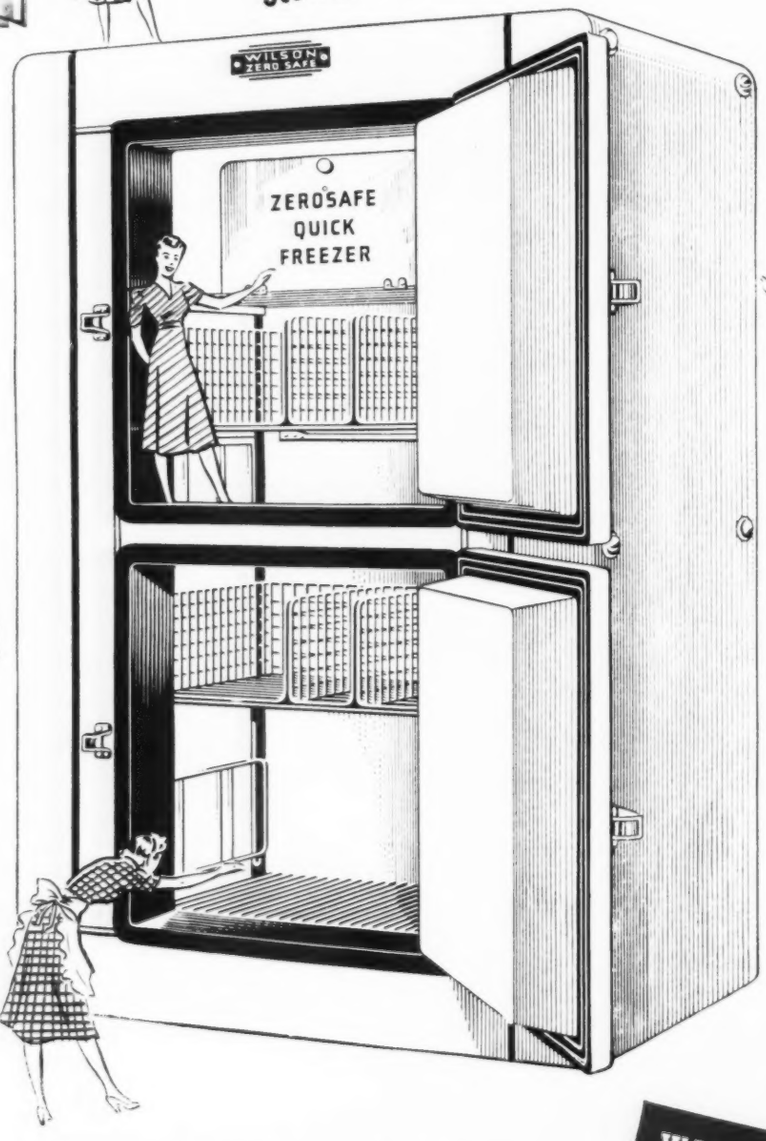
Look 'em all over.. but don't overlook WILSON!

The Reach-In Freezer That Fits Farm Needs



It has separate storage shelves!

You can add additional sections as needed!



Gleaming white Dulux enamel!

The quick-freeze compartment is so BIG!

5¾" Fiberglas Insulation!

The food is so easy to see!

Wilson Zero°Sate Farm Freezer
Sectional Model FF-30
Stores 1008 lbs. of food

Look!... You can reach IN!

It takes up so little space!

Here is the complete freezer for the farm! The Wilson front-opening freezer that features *modern reach-in convenience*. The freezer that never gets too small for your needs . . . you can add additional sections to the original unit as your need for more food storage space increases. Each section is fully portable and is easily put in place as an integral part of the finished Wilson "Zero°Safe" Freezer. Every section has the same big, quick-freeze compartment for faster freezing at a scientifically determined temperature which retains the natural food flavor and value; *separate storage shelves* to make all food easy to find; and all these features in *upright* cabinets that occupy the smallest amount of floor space per cubic foot of capacity.

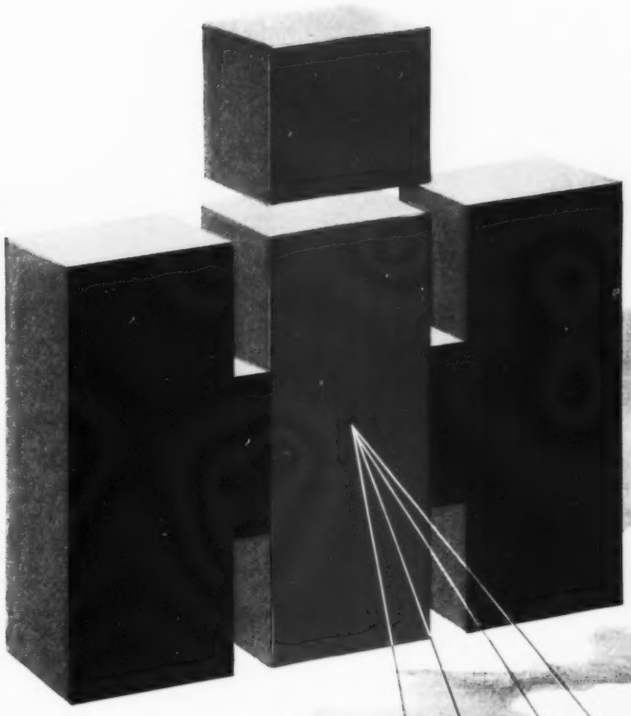
Send today for your copy of the Wilson Freezer Guide . . . your guide to better living.

WILSON REFRIGERATION, INC.

DIVISION OF WILSON CABINET CO., INC., SMYRNA, DELAWARE

FARM MILK COOLERS and FREEZERS

DEALERS EVERYWHERE OR WRITE US DEPT. FQW

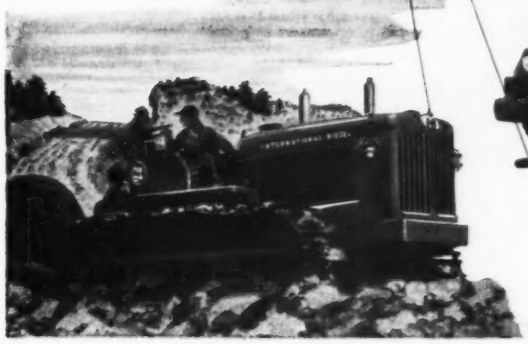


THIS SYMBOL MEANS...

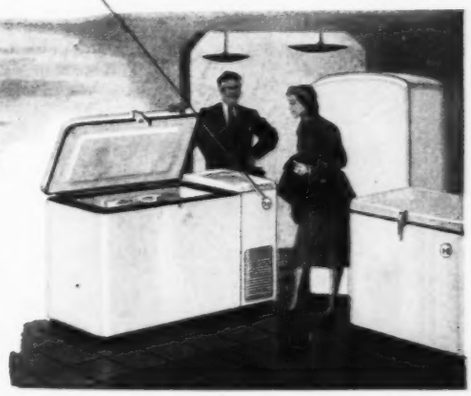
Product of

INTERNATIONAL HARVESTER

The International Truck Line provides the right truck for every job. It is the *only* complete line built. It *specializes* into more than 1,000 types of trucks, with gross weight ratings ranging from 4,400 to 90,000 pounds.



Biggest and most powerful of International Crawler Tractors is the 18-ton, 180 h.p. model TD-24 . . . newest member of a mighty Diesel lineup. In fields and graves, farmers rely on Internationals for ready adaptability and low-cost performance.



International Harvester Freezers in 3 sizes—4, 11, and 15 cu. ft. —bring the year-around, at-hand convenience of frozen foods to large and small families alike. Also available: 3 models of the new 8 cu. ft. IH household refrigerator.

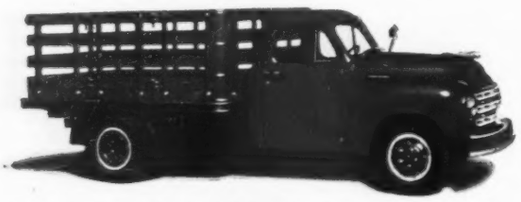
A quarter of a century ago, an engineer's idea . . . today, a reality: a group of five all-purpose tractors with matched machines for every size farm, every crop and soil condition. *That's the Farmall System!* Above: Farmall C with TOUCH-CONTROL.

Good listening! James Melton on "Harvest of Stars." Wednesday evenings, CBS Network.

INTERNATIONAL HARVESTER COMPANY

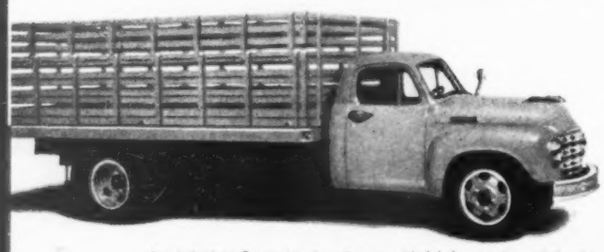
180 North Michigan Avenue Chicago 1, Illinois

Studebaker ¾-ton, 8-ft. pick-up—a ½-ton, 6½-ft. pick-up, too.



Studebaker 1-ton shown with 9-ft. stake; 8-ft. pick-up model, also.

The new 1½-ton Studebaker truck—shown with insulated milk body.



Studebaker 2-ton truck—shown with 14-ft., stock rack body.

Get a 1949 Studebaker truck! It's the newest and finest!

Most revolutionary change in truck design and engineering in many years!

NO wonder the husky, handsome new 1949 Studebaker trucks attract a world of attention! They stand out like Studebaker's far advanced postwar cars!

They're sensationally new trucks in exterior design—and they excel just as conspicuously in handling ease, riding comfort and cost-cutting performance.

These 1949 Studebakers have more time-saving, spine-saving, cost-saving improvements than any trucks you've seen.

They're the revolutionary result of years of brilliant Studebaker engineering research—honor graduates of the world famous Studebaker proving ground.

You don't worry about slippery running boards in bad weather. The broad, sure-footed steps of these pacemaking Studebaker trucks are snugly enclosed inside the doors of the driver's cab.

That cab, incidentally, is a postwar marvel of head room, hip room, leg room, wide-range vision, controlled ventilation.

Here, too, for the first time in a truck is real "lift-the-hood" accessibility. No standing on a box to get at the engine or ignition—no fumbling under the dash to adjust instruments and accessories.

Stop in at a nearby Studebaker dealer's showroom first chance you have. See how nicely a new 1949 Studebaker truck would fit into your requirements.

STUDEBAKER TRUCKS

NOTED FOR LOW COST OPERATION

© The Studebaker Corporation, South Bend 27, Indiana, U.S.A.

For a FULL TRACTION BITE . . . It's Firestone

LOW PRESSURE*

CHAMPION GROUND GRIPS

THE TIRES THAT

OUTCLEAN No tractor tire can pull unless it cleans. Firestone Champions OUTpull because they OUTclean. The *full-traction tread bars* flare outward like the moldboard of a plow and channel the soil out as the tire rotates and flexes. There are no trash-catching "bar stubs."

OUTPULL The real test of a tractor tire is how it pulls when the going is tough. You can depend on Firestone Champions to OUTpull because their traction bars are built higher for a deeper bite, longer for a bigger bite, Triple-Braced for a stronger bite, and connected at the center for a *full-traction bite* — all-the-way-across-the-tread.

OUTLAST Firestone Champions OUTlast because their Triple-Braced bars cannot wobble and wear, cannot punch their way through the cord body like unbraced bars. The higher, longer, stronger bars of the Champion ride smoother, last longer. It's easy to see why Champions continue to give *full-traction tread life* long after other tires have worn smooth.

THE ONLY TIRE MADE THAT TAKES A FULL-TRACTION BITE ALL THE WAY ACROSS THE TREAD

*** RUNS ON ONLY 12 LBS. PRESSURE**

For a tire to give full traction, it needs not only a full tread, but also a tread that is in full contact with the ground. By maintaining air pressure at twelve pounds, Firestone lets the whole tread come down to earth. The Champion can run safely on such low air pressure because its stronger tire body makes overinflation for sidewall support unnecessary. You get surer footing, smoother going, longer *full-traction tread life.*

Listen to the Voice of Firestone every Monday evening over NBC

FOR MORE INFORMATION SEE YOUR FIRESTONE DEALER, FIRESTONE STORE OR IMPLEMENT DEALER

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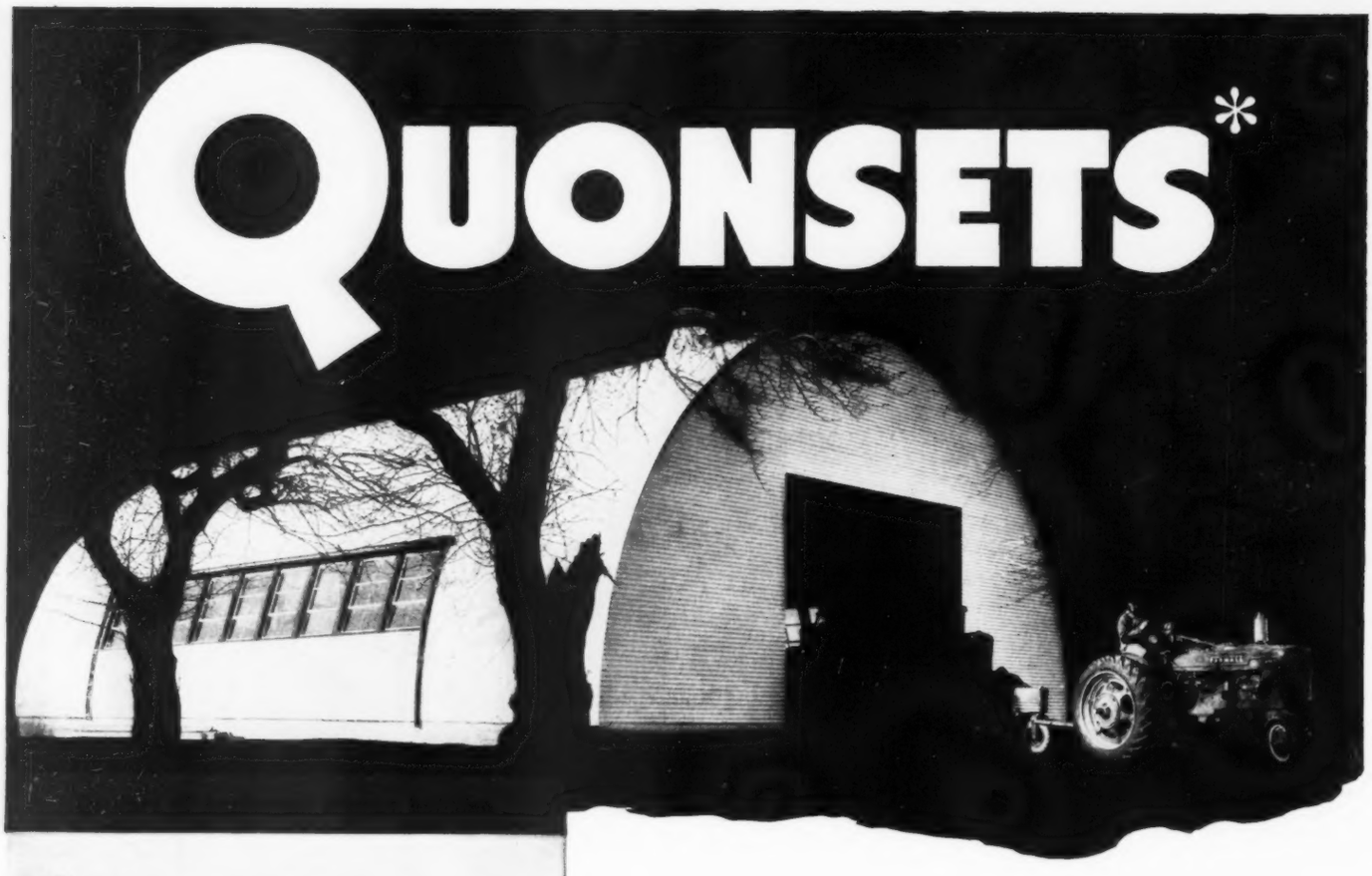
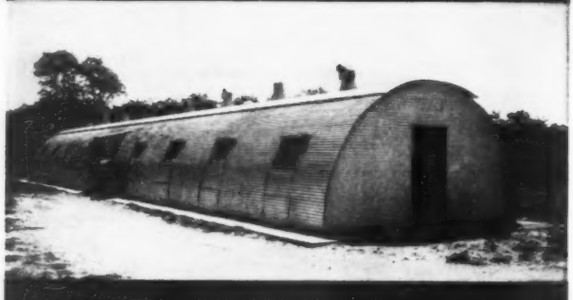
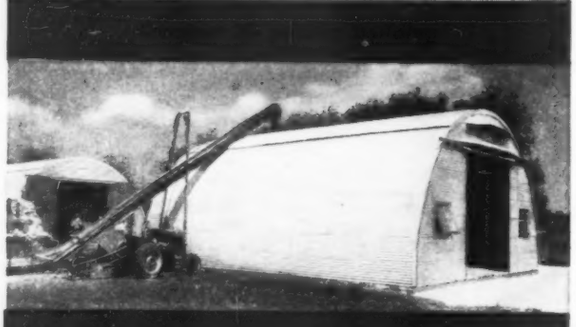
QUONSETS*







YOU NAIL TO STRAN-STEEL FRAMING

Great Lakes Steel Corporation
Stran-Steel Division, Dept. 28
Penobscot Building, Detroit 26, Mich.

I should like complete information on the Quonset for use as:

☐ grain storage barn ☐ corn storage barn ☐ dairy barn
☐ implement storage barn ☐ hog house ☐ poultry house
☐ portable corncrib feeder ☐ _____

NAME _____

ADDRESS _____

CITY, STATE _____

Meet Your Farm Building Needs *FASTER . . . BETTER . . . AT LESS COST*

You can have a Quonset dairy barn, a Quonset grain storage barn, a Quonset poultry house. You can use the efficient, clear-span floor space of a Quonset to shelter livestock and implements. Whatever your building requirements, you'll find a Quonset of the right size and type to meet them more satisfactorily, more economically.

You get your building sooner with a Quonset, too. There's no delay caused by scarce materials—your Quonset arrives at your site completely ready for assembly. And construction is faster. Your Quonset will be complete days before any other type of building could even be roofed over!

Rugged, all-steel Quonsets are fire-resistant, rot-proof, termite-proof—reduce maintenance costs to a minimum. You can insulate or line your Quonset with any material you choose, because you nail directly to the Stran-Steel framing members.

These are only a few of the advantages that make Quonsets your best farm building buy. See your local Quonset dealer for complete details, or mail the coupon.

*REG. U. S. PAT. OFF.

GREAT LAKES STEEL CORPORATION

Stran-Steel Division • Dept. 28 • Penobscot Building • Detroit 26, Mich.

UNIT OF NATIONAL STEEL CORPORATION

COMING IN SPRING

WHAT HAPPENS to a field when you plant corn in it for 68 years in a row? Lowell Hissong, who lives near Champaign, Ill., can stand at his front door and see a corn field that will go 100 bushels to the acre after a half century of straight corn. We wanted to see the farming on the Grand Prairie for ourselves, a country so flat you can see a whole section when you stand along the fence line in any part of it. The Spring issue will explore the methods of these prairie farmers who raise few cattle and fewer hogs, use very little fertilizer, and practice a rotation that would kill ordinary soil in a few years.

Grassland farming, which is claiming the attention of farmers everywhere, naturally leads to grass silage. The various methods, the best mixtures, and how and when to ensile will be a Spring issue feature. Special crops which will be given the definitive *Farm Quarterly* treatment will be broom corn, buckwheat, and sunflowers.

Spaghetti a la Italiana at Riccardo's Restaurant in Chicago brings the customers to this fine Italian restaurant from all over the Chicago area. The difference between their spaghetti and the home-boiled variety is the use of herbs: a few pinches of basil and parsley, a touch of bay leaves, a clove of garlic, and a soupçon of pepper. The growing of these special herbs for market is a lucrative business for a small group of farmers who cater to the drug, food, candy, and condiment markets. Our herb story will cover the large commercial operations as well as the home herb garden. The housewife who wants to plant her own herbs will find in the article explicit directions for their culture.

For those who like rabbits but have qualms about slaughtering them for meat, there will be an article on raising Angora rabbits for wool. Clipping their wool is a profitable business; like gold, it's sold by the ounce.

Dairymen will find valuable information in an article on Acetonemia, an ailment of dairy cows which is commoner than most dairymen believe. The over-all subject of feeding hogs is discussed by Dr. John H. Zeller, swine specialist at the USDA Experiment Station at Beltsville, Maryland. Dr. Zeller describes the most profitable management, the various rations for market hogs, brood sows and pigs.

Dr. Myron Hazen, who has put worn-out pasture fields back into production all over the country will have an article on what to do with a pasture in the spring to make it outlast the summer. There will be a short article on how to dig a post hole by a specialist who has reduced this back-breaking job to a fine art.

Other feature stories in the spring line-up are: "The Law of Farm Animals," a resume of laws that govern the misconduct of your livestock; "Wood Preservatives," for use on posts and building timbers; "The Farm Cat" (friend or enemy?), and an article on training a cow dog.

THE FARM QUARTERLY
22 East 12th St., Cincinnati 10, Ohio

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Grant Cannon.....**Managing Editor**
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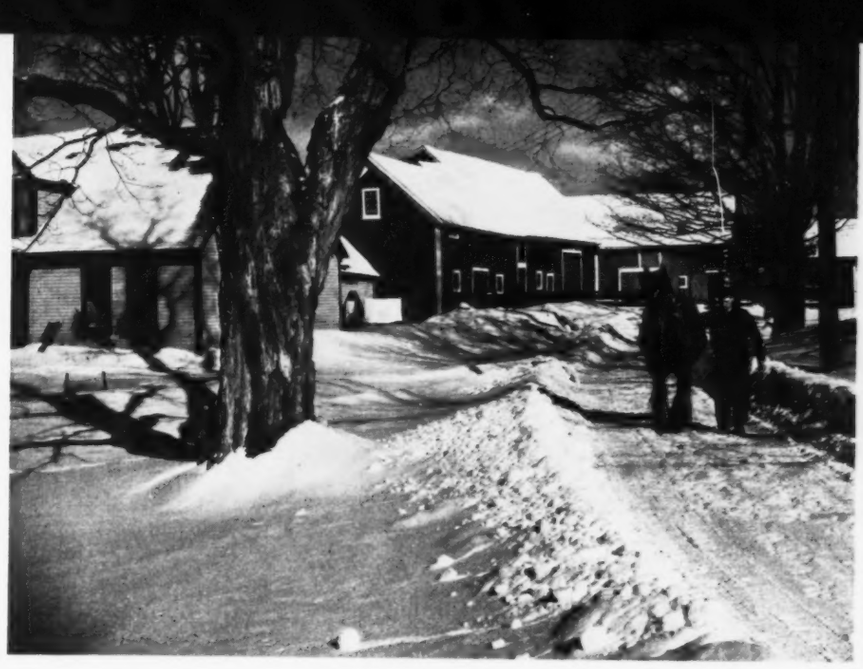

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Contributing Editors: B. G. DeWeese, Ray Dunn, Robert Graham, Myron S. Hazen, Ralph Kenney, B. J. Killham, Charles Krutch, C. M. Long, J. E. McClintock, Banner Bill Morgan, Virgil Overholt, Charles A. Reese, Dave Roberts, G. W. Salisbury, George D. Scarseth, J. W. Schwab, Katharine A. Smith.

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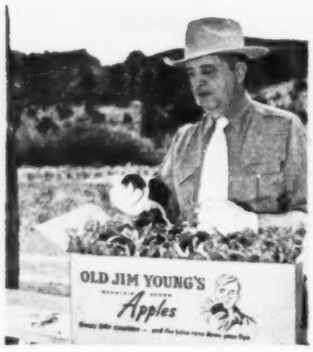
JIM YOUNG'S Smart idea!

Old Jim Young sells the snap and crackle of mountain grown apples by mail!

"THE IDEA WAS BORN on an abandoned homestead in the Jemez Mountains of New Mexico," relates Ford Truck user Jim Young. "In a canyon there, I noticed one old apple tree with fine looking apples on it. A Spanish fellow told me he had picked fruit from that tree every fall for twenty-odd years. Figuring this was a good frost-free spot, I cleared and terraced the land, dug irrigation ditches, set out apple trees. Ford Trucks were a big help in getting my idea started. They still are!"

JIM YOUNG and son Webb (left) discuss a proposed mail order advertisement. "Every bite crackles . . . and the juice runs down your lips" is typical taste-teasing Young claim.

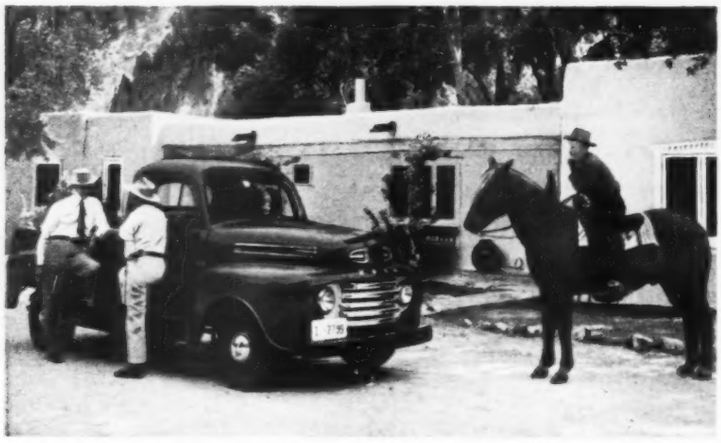


PACKED AS FAST as picked, under Jim Young's personal supervision, the cartons of apples are trucked immediately to the express office.

APPLES BY MAIL is only one of the Young ideas. Son Webb trades with Indians for hand-woven neckties, silver work, other handicrafts which make the Youngs' mail order selling a success.

JIM YOUNG'S Smart move!

He selects Ford . . . the Bonus Built Truck, to do the hauling in his business. Smart move! Smart business!



NEW FORD PICKUP TRUCK is demonstrated to Young by Ford Dealer, Joe DuBois of Santa Fe. "If this truck can stand up and take it like the older Fords," says Jim, "it's a mighty fine piece of machinery." Replies Joe DuBois, "There's no reason why it shouldn't stand up even better. It's built stronger. Every one of over 139 Ford Truck models has big strength-reserves which extend truck life."

THE COCHITI INDIAN truck driver and Jim admire a smart idea in Ford engine design. "Locating that distributor high on the engine so water can't get at it when a truck splashes through one of our running arroyos is a smart idea," says Jim Young.

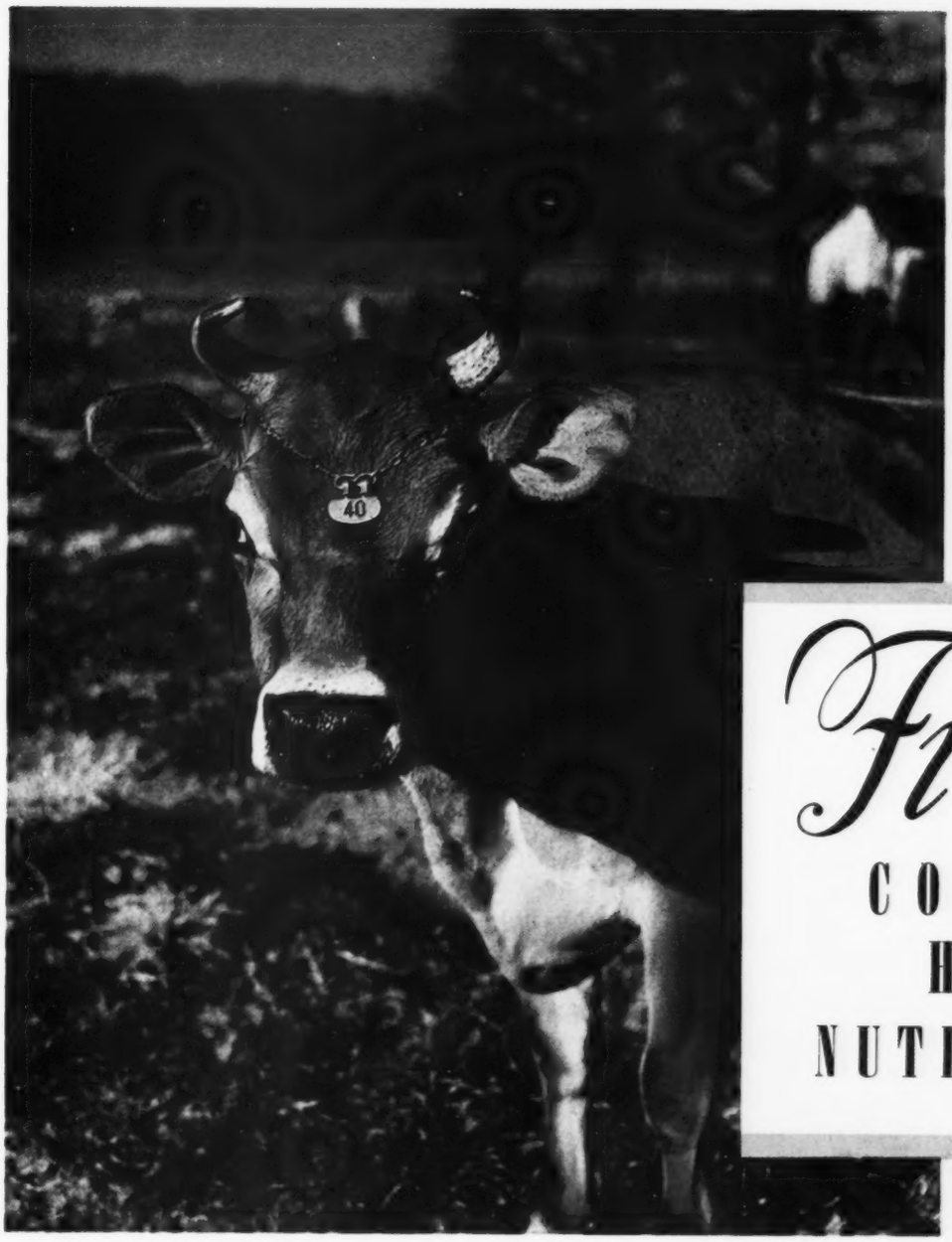
"THIS AIR WING VENTILATOR in the door glass is practically a Ford Truck exclusive," says Ford Dealer Joe DuBois to Jim Young. "It's *standard* on Ford Trucks, but you can't get it for love or money on 9 out of 10 other new trucks."

"IT'S A BIGGER BODY than it looks," says Jim Young. "For orchard work and Indian trading it's just what we need. And I like that all-steel floor, too." "Yes," replies Joe DuBois, "any way you look at it Ford's the smart move for any load."

JIM YOUNG'S Smart bet!

FORD TRUCKS LAST LONGER!

Using latest registration data on 5,444,000 trucks, life insurance experts prove Ford trucks last longer!



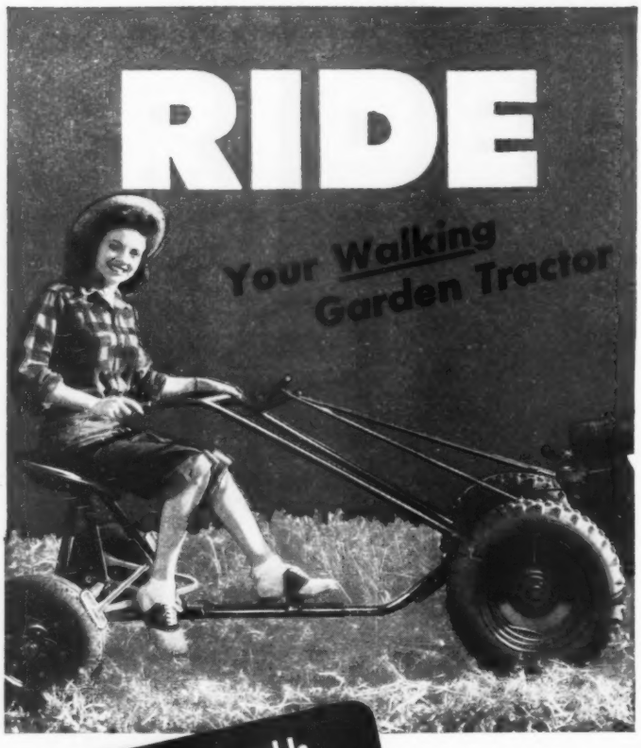
First COMES HER NUTRITION

Before a cow can *produce* at top efficiency and profit, her feeding program must first provide the necessary nutrition "input" elements. . . . Nutrition research and farm practice have established the value of Seagram Dried Grains as an integral part of the most practical and effective combinations of milk producing feeds. Through nutrition research, and its practical application in feed products and information, we support "our end" of the livestock progress picture.

JOSEPH E. SEAGRAM & SONS, INC.

GRAIN PRODUCTS DIVISION • BOX 240, LOUISVILLE 1, KENTUCKY

Seagram SERVICE TO AGRICULTURE

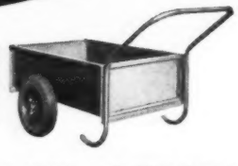


Get a Comfortable DANDY BOY Riding Sulky

DON'T WALK when you can ride! This new Dandy Boy Riding Sulky takes you off your feet — puts you in a comfortable seat over two cushiony rubber-tired wheels. Wherever your tractor goes, you ride in comfort . . . in style . . . with controls within easy reach. Be one of the first to enjoy this new Dandy Boy Riding Sulky!

Get one of the new Dandy Boy Dump Carts, too. Users say "it's the handiest thing on the place." Haul wood, shrubs, sod, garden tools, transplants, crates or baskets. All steel. Removable gates. Convenient seat and foot rests. See your dealer NOW!

Enjoy This Convenient DANDY BOY Dump Cart



A tubular steel handle is furnished with each unit so it can also be used as a push cart.

SPECIAL COMBINATION OFFER!

So many people want *both* the Dandy Boy Riding Sulky and Dandy Boy Dump Cart that a special combination deal is now available. You can save 30% by ordering Deal No. 125, because you need only *one* set of wheels for both outfits. It takes only a few minutes to switch from the sulky seat to the dump cart and back again. Whether you want the riding sulky, the dump cart, or both — see your garden tractor dealer NOW. He can give you immediate delivery. Put these easy-riding attachments to use in your yard and garden. Save time. Save work. Get extra pleasure—and extra use out of your garden tractor! Complete literature on request.

See your Garden Tractor Dealer or Write Direct to Dept. FQ-149

THE MIDLAND CO.
SOUTH MILWAUKEE, WISCONSIN

LETTERS

LET'S ARGUE

Sir:

When your Quarterly first appeared I subscribed for it, but when my subscription expired, I did not renew. Your articles are not aimed at practical working farmers, but apparently at swivel chair farmers.

A. R. Dan Kinbring
Rt. 5
Waterloo, Iowa

Dear Sirs:

What can I say to express my gratitude for your magazine. I am now past 70, settled here in 1912 when there were no roads but surveyor's blazed lines. Many of the early settlers are dead and their farms derelict, but we have hung on.

Before leaving England in 1910 I worked seven years part time in a Gas Works as a fitter and part time in the Nurseries. I observed many methods with various fertilizers in the hot houses and remember from past and present we cannot get something for nothing in farming. If I sit idle there will be lack of results.

Your article "Barnyard Gold" I have read over and over and if a neighbor wants to borrow a copy that one doesn't go for fear it won't be returned. All winter we haul manure direct to the fields. The cow stable has a wide sliding door on the south side and we have a jumper with sides that will receive the load from 15 cows each day. Our sheep, about 50, spend most of the winter inside. I have been putting the sheep manure in small piles in the cow pasture and covering it with an equal amount of muck from a ravine close by. In the fall my son will take the tractor and grader and scrape them over the pasture.

Whatever your subjects, there are generally parts from which I get inspiration.

Wm. Wright
Matheson, N. Ont.

THE OLD BULL

Sirs:

The Old Red Bull (Summer, 1948), is true in all details and very well written. I know, because I lived through that period and many a time watched the threshing operations on my father's farm. One thing that distressed me as a child was watching the teams that went round and round in a circle, stepping over the tumbling rod that ran to the separator. This rod furnished the power for separating the grain and was later replaced by steam engines and on down, until now the combine.

When I found this contribution to your magazine, I was delighted that some one could still tell the story so well. Only an old timer can appreciate how typical was the picture and performance of Uncle Jud.

Mrs. Myrtle V. Pogue
Grant, Iowa

LUNGS OR LIVER

As usual the autumn issue of the FARM QUARTERLY was a fine one. However, I was very much chagrined to find one of the illustrations of Mr. Zinn's article on Cholera on page 40 captioned "liver" when actually the picture shows the lungs.

Banner Bill Morgan
University of Wisconsin
Madison, Wisconsin

Farm Quarterly's face is red. Somewhere along the line the caption and picture were transposed. Regardless of our effort to make a liver out of a pair of lungs, a number of our sharp eyed readers caught the error. Ed.

GO WEST

I find your magazine more informative than any farm magazine I have had the opportunity of reading. However, I am very much disappointed to find that very few of the articles or suggestions discuss the Southwest. This area covers a tremendous agricultural district and is in great need of information especially applicable to it. I am sure that there are many of us who would appreciate information which touches our area.

Gustav A. Pagenstecher, M.D.
San Antonio, Texas

Many readers have asked us lately about our neglect of Western agriculture. There are good reasons for the small number of articles on Western agriculture. Printing difficulties and, until recently, paper shortages, have prevented us from shipping more than a token number of copies into the West. As soon as we can increase our press run and get more copies into the West we shall broaden our coverage of Western farming. Ed.

The WINNER . . . and STILL

CHAMPION

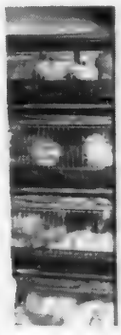
In 1948

In 1947

NEELJTE FOBES MECHTHILDE, many-time winner in '47, repeats in '48! Moreover, this top Holstein, raised and fed the Wayne Way all the way by Donald Plote, Elgin, Ill., is marking up outstanding milk production . . . giving 10,883 lbs. milk, 423 lbs. butterfat in only 204 days of her first lactation.

1947 WINS: Reserve All-American Holstein Sr. Yearling; 1st Sr. Yearling and Jr. Champion, Illinois Black & White Show and Illinois State Fair; 1st Sr. Yearling, Waterloo Dairy Cattle Congress.

1948 WINS: 1st—2-yr. old—Illinois Black & White Show and Illinois State Fair; Grand Champion, Illinois State Fair—Junior Show.



"WEANED 92% OF 123 PIGS FARROWED FROM 12 GILTS,"

says Rufus L. Decker, Bluffton, Ind., steady Wayne user for 10 years. Pigs weaned per litter—9.4—as compared to national average of 6.2; feed cost for sows from breeding thru farrowing only $3.46 per pig at 2 weeks of age; first 109 marketed hit 225 lb. average at 178 days—these are chapters in Mr. Decker's success story on feeding the result-getting Wayne Way.

"SINCE FEEDING THE WAYNE WAY, HAVE MADE MORE MONEY THAN I EVER ANTICIPATED,"

says cattle-raiser Herman Lindholm, Naperville, Ill. Feeding steers since 1940, Mr. Lindholm believes in plenty of protein during the growing period, reports average daily gains of 2 lbs. during the 10 to 11 months' growing and fattening period. About Wayne Sweet Mix, he makes this statement, "I like it because it is a high protein supplement; contains no screenings, has enough molasses to make cattle start eating at once; keeps 'em on feed throughout feeding period; produces excellent finish and high dressing percentage so that buyers are always anxious to get my cattle."

"GREW COCKERELS TO 2.06 LBS. IN 8 WEEKS AND 2 DAYS ON 6 LBS. FEED,"

reports S.G.Gorsline, Battle Creek, Mich., who starts over 1,000 chicks every other week in this modernly-equipped broiler plant. One lot averaged 2.55 lbs. at 8 weeks! Livability 96.6.% Feeding program: Wayne Chick Starter, first 3½ weeks, Flushing Mash at end of 1st and 2nd week, Broiler Ration balance of time, Chick Grains at night.

YEAR AFTER YEAR . . . THE *Wayne Way* PAYS!

Nationally-known poultry and livestock feeders have proved it. Countless local, state, regional and national records have proved it. *Your own results and experience*—in show-ring or feed-lot—will prove it. See your friendly Wayne Feed Dealer now for full details . . or send coupon below.

Allied Mills, Inc., Ft. Wayne 1, Ind.

Send free feeding information on

Chickens ☐ Turkeys ☐ Calves ☐

Hogs ☐ Dairy Cows ☐ Beef Cattle ☐

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Back of every successful livestock enterprise is a sound feeding program

WAYNE FEEDS

WAYNE POULTRY AND LIVESTOCK FEEDS

Extra work from your

Ford

TRACTOR

Handy Power for those "Off-Season" Jobs..

ORDINARILY, "odd" jobs and "off-season" jobs are the hardest work on a farm. Just thinking about them makes you want to put them off.

But the Ford Tractor is right not only for field work; it is the answer to those "odd" jobs, too! So, with a Ford Tractor, you gain two ways. First, field work goes faster, saving time for improving your farm. Second, for this improvement work, it serves you as faithfully as it does in the field.

Time and Labor Saved in Dozens of "Mean" Jobs

For example, the Ford Tractor, with Dearborn Equipment, is the right combination for ditching, leveling, terracing . . . cleaning barnyards and feed lots . . . loading manure, stacking hay . . . sawing wood, making fences, plowing snow.

Quick-Attaching Equipment... Ford Hydraulic Touch Control

These Dearborn tools, designed for the Ford Tractor, can be quickly attached or detached. You lift and lower them with Ford Hydraulic Touch Control.

All these advantages enable you to start a job, get it over with and pick up another . . . with less time lost. In the field or out of it, the Ford Tractor is your best investment all year 'round.

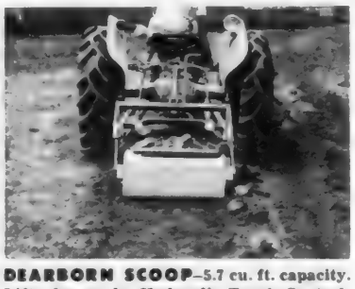
And... the Ford Tractor gives you 3-Way Depth Control!

Through Hydraulic Touch Control and Implement Position Control you have three ways of maintaining uniform implement depth.

1. When land is rough or "corrugated," but of uniform texture.
2. When land is smooth but of various soil textures.
3. When land is *both* rough *and* has changing textures.

For each of these conditions you have a means of keeping the implement at uniform working depth . . . *3-way* Depth Control. Saves time and work and makes a better job.

ALL AROUND THE FARM... ALL THROUGH THE YEAR



DEARBORN SCOOP–5.7 cu. ft. capacity. Lifts, lowers by Hydraulic Touch Control; dumps by trip lever.

DEARBORN UTILITY BLADE–Cuts [illegible] width. Lifts, lowers, holds depth Hydraulic Touch Control.

DEARBORN CORDWOOD SAW–Lowered to steady working position or raised for transport by Hydraulic Touch Control.

DEARBORN BLADE SNOW PLOW Use straight or angled. Lifts, lowers [illegible] Hydraulic Touch Control. 72" edge.

DEARBORN MOTORS CORPORATION • DETROIT 3, MICHIGAN

FORD TRACTOR WITH DEARBORN ANGLE DOZER*

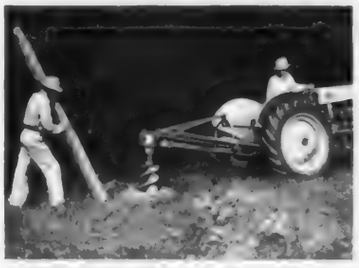
Pushes dirt ahead or to right or left. Either end tilts up or down for ditching. Lifts and lowers by Hydraulic Touch Control. Cuts 60" angled, 72" straight.

Dearborn

FARM EQUIPMENT

ARBORN IMPLEMENTS GIVE YOU SATISFACTION

RBORN LOADERS—Standard re and material loader lifts, lowers ulically. There is also a heavy duty r.



DANUSER POST HOLE DIGGER—Up to 600 holes a day. Power take-off drive. Lifts, lowers by Touch Control.

RBORN V SNOW PLOW*—Cuts idth. Lifts and lowers by Hydraulic Control.

LAND LEVELER—For leveling, grading, moving dirt—Hydraulic Touch Control. 8 foot cut.

To use any of these three tools with the Ford Tractor requires only one basic, or "Universal" Frame, priced and sold separately.

Your Ford Tractor Dealer is a good man to know BETTER

No matter how well you know the man who sells Ford Tractors and Dearborn Farm Equipment in your part of the country, it will pay you to know him better. *Farming is his business, too.*

Find out about the time, work and money-saving equipment he can offer you. Listen to his ideas on getting more profit per acre and per hour of work. Learn about his prompt, dependable tractor and implement service.

Welcome your Ford Tractor dealer when he comes to see you . . . and, when you're in town, stop in. He's a good man to know better.

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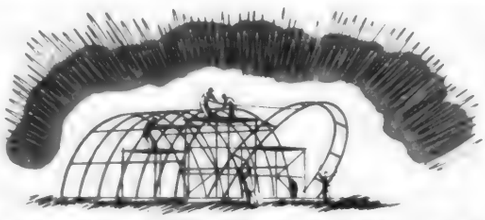
Ford Farming MEANS LESS WORK... MORE INCOME PER ACRE



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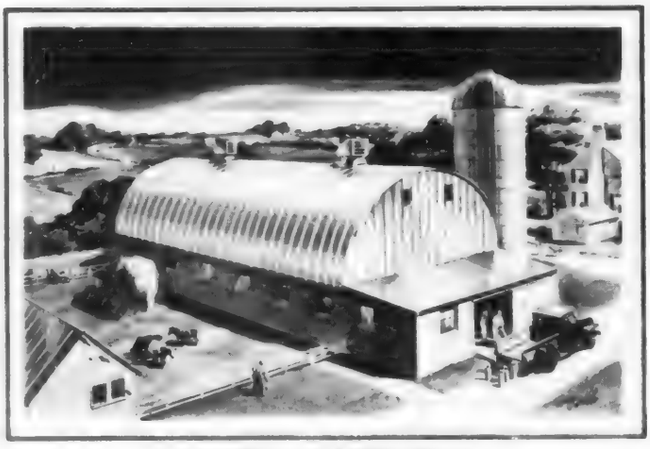
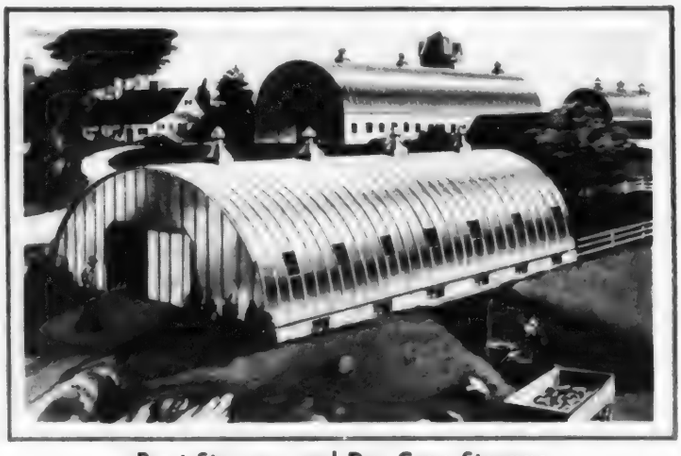
Easily and Quickly Erected!

Implement Shed and Dry Crop Storage



Cow Barn and Milk Shed



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IMMEDIATE DELIVERY..the Entire Structure Complete in a Single Shipment..with Easy-to-Follow Assembly Instructions!

A better building because it's rustproof aluminum . . . never needs painting, eliminates maintenance. A cooler building in summer, warmer in winter . . . because aluminum reflects up to 95% of radiant heat. A building that's permanently weather tight . . . because the heavy gauge rigid-embossed sheets are gripped between heavy bolted channels—held tight like a drumhead all around. No nail holes to caulk! No tarring of seams!

You can have this building erected in a matter of days. It's put together entirely with aluminum bolts through factory-drilled holes. And that same patented feature makes it easy to dismantle, re-erect, alter or add to your Alumi-Drome.

Basic unit is 36′ x 60′, length variable by 6′ sections. All clear space—no inside posts or trusses. Nine standard end designs. Endless variations in practical plans. Write for literature and name of nearest distributor.

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Reynolds Pioneering made Aluminum Competitive . . . take advantage of it!

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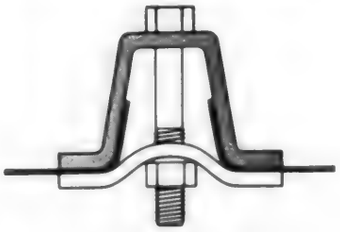
NO NAILS · NO HOLES
IN ANY WEATHER SURFACE



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NO RUST · NO PAINTING
NO MAINTENANCE

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Reynolds Metals Company, Alumi-Drome Division
Dept. FQ-12
Louisvillle 1, Ky.

Please send full information on the Alumi-Drome

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Deep down in his heart...

Every man wants the Best of Everything

. . . and that's why so many farmers are willing to wait for their John Deere Model "M" Tractors.

The Model "M" represents all the "know-how" of 30 years of tractor building experience. Only the *best* in modern design and construction could qualify to meet its engineering specifications.

But John Deere wasn't satisfied with that. Farmers from all sections of the U. S. and Canada . . . truck growers . . . orchardists . . . berry growers . . . poultry raisers . . . men who operate farms of 100 acres and under . . . were asked what *they* wanted in this new post-war tractor.

The result is the John Deere "M" as you see it today—the one *complete* power farming unit—the one tractor that has everything that's *good*.

And that's why the "M", with its full line of hydraulically-controlled "Quik-Tatch" tools, is enjoying countrywide success as a complete system of farming on the smaller farms and as a "helper" on the larger farms.

True—there are cheaper tractors, but none that offers so many extra values in power . . . in performance . . . in operator's comfort and safety . . . in wide adaptability . . . in ease and economy of servicing . . . and in handy, practical working equipment.

The wide demand for the extra values that are built into the John Deere Model "M" proves again that *deep down in his heart every man wants the best of everything*—and is willing to wait for it if necessary.

That's why we say—don't set a price on *your* new tractor. Buy it because you like it . . . because of the good it will do you . . . the time and money it will save you . . . the greater enjoyment it will bring to you and your family.

Get acquainted with the "M" if you have not already done so. Get the feel of the wheel. Then, we believe you, too, will say *"Make Mine a Model 'M'."*

JOHN DEERE
Model "M" General-Purpose Tractor and Equipment

BETTER than a "FAIR" record

Where

champions are recognized, B-F Solubles places first as a high protein-high vitamin supplement. The official records of the seven big Midwestern state fairs show that 81.6% of all blue ribbon winners in the Shorthorn classes were fed B-F Solubles. This record is even more impressive in that it includes 5 grand champion bulls, 7 grand champion females, 5 reserve champion bulls and 5 reserve champion females.

107 WINNERS IN 131 CLASSES were B-F SOLUBLES-fed

SHORTHORNS—NEBRASKA STATE FAIR 1948
11 BLUE RIBBONS Out of 19 Classes
1 Grand Champion Female
1 Reserve Champion Female

SHORTHORNS—MISSOURI STATE FAIR 1948
12 BLUE RIBBONS Out of 18 Classes
1 Grand Champion Female
1 Reserve Champion Bull

SHORTHORNS—ILLINOIS STATE FAIR 1948
18 BLUE RIBBONS Out of 19 Classes
1 Grand Champion Bull
1 Grand Champion Female
1 Reserve Champion Bull
1 Reserve Champion Female

SHORTHORNS—OHIO STATE FAIR 1948
16 BLUE RIBBONS Out of 19 Classes
1 Grand Champion Bull
1 Reserve Champion Bull
1 Grand Champion Female

SHORTHORNS—INDIANA STATE FAIR 1948
17 BLUE RIBBONS Out of 19 Classes
1 Grand Champion Bull
1 Reserve Champion Bull
1 Grand Champion Female
1 Reserve Champion Female

SHORTHORNS—IOWA STATE FAIR 1948
15 BLUE RIBBONS Out of 18 Classes
1 Grand Champion Bull
1 Grand Champion Female
1 Reserve Champion Female
1 Grand Champion Pair

SHORTHORNS—KENTUCKY STATE FAIR 1948
18 BLUE RIBBONS Out of 19 Classes
1 Grand Champion Bull
1 Reserve Champion Bull
1 Grand Champion Female
1 Reserve Champion Female

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PROVIDES

true VITAMIN A
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NEW IDEA SPREADERS — tested guardians of soil productivity.

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Feeding more millions than ever before has America's farmers working overtime. And never has the reliable performance of NEW IDEA Farm Equipment proved so important to your profits. You'll find these fast-moving, time-saving machines in action all along the coast-to-coast "production line" — helping in a big way to satisfy the world's multibillion-dollar appetite.

Today's NEW IDEA equipment is exceptionally well matched to agriculture's tremendous task — to *your* individual requirements. Each is a product of long familiarity with farm needs, designed in every detail to do its particular job better. Outstanding dependability . . . unmatched endurance . . . advanced engineering — all are deep-rooted NEW IDEA qualities.

Send for special free Anniversary Literature Packet, consisting of a profusely illustrated Golden Jubilee Booklet and a General Catalog of New Idea Farm Machines. Mail a post card today!

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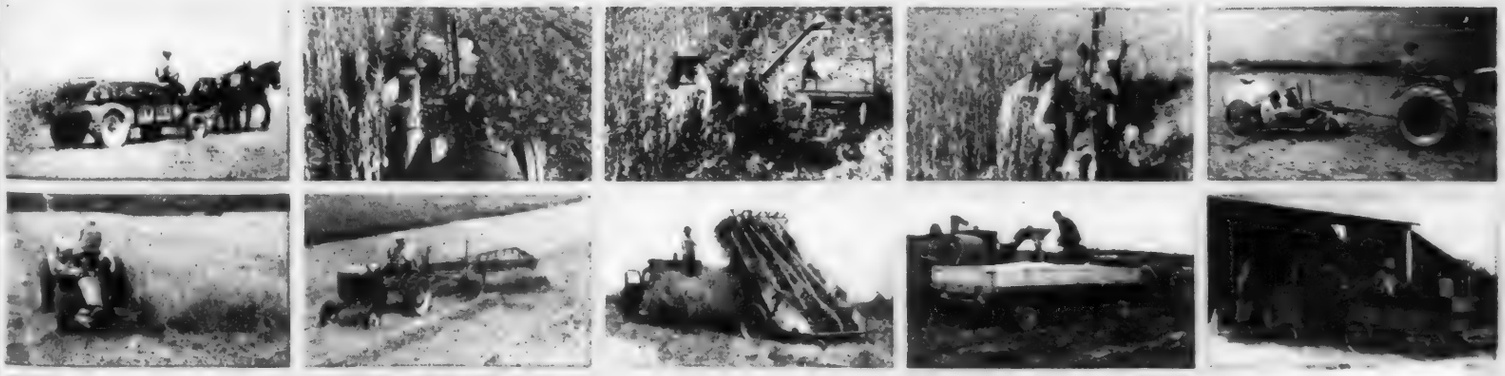

Ask your NEW IDEA dealer to explain the many features that assure *lasting* satisfaction from these specialized machines. Or mail coupon for free descriptive folders.

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NEW IDEA Division — AVCO Manufacturing Corporation

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Send free descriptive literature on machines checked:

- ☐ Manure Spreaders
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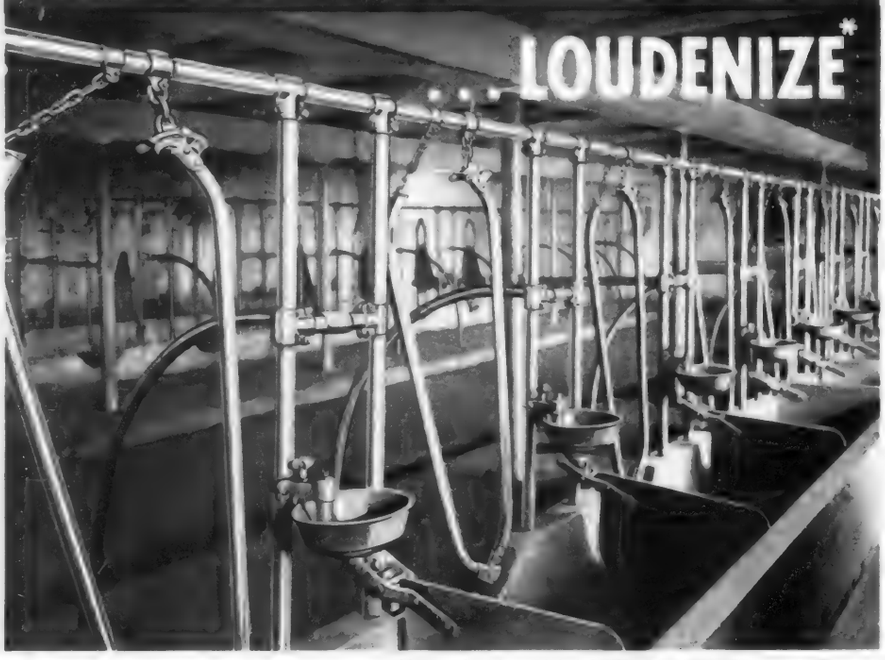
THE BEST WAY TO INVEST TODAY'S FARM DOLLAR...



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*to modernize with LOUDEN equipment

FOR STALLS, STANCHIONS, or any other barn equipment, see your Louden dealer. He can help you LOUDENIZE — best way to invest today's farm dollar.

There never was a time when Loudenizing your barn could pay greater dividends — or cost less in farm products. Year after year, Louden Equipment saves more time and labor — HELPS YOU MAKE MORE MONEY.

In 1867, Louden established the Barn Equipment industry. Louden's record since has been a steady procession of "firsts" — Steel Stalls, Automatic Water Bowls, Litter Carriers.

For help in modernizing your present barn — or designing a new one — look to Louden and your local Louden dealer. If you don't know his name, write us.

THE **LOUDEN** MACHINERY COMPANY

Fairfield, Ia. Albany, N. Y.

LOUDEN BARN EQUIPMENT

The Dairy Barn

A BRIEF SUMMARY OF THE NEWEST DEVELOPMENTS IN DAIRYING AND THE CARE OF DAIRY CATTLE.

Hormones For More Milk When Professor C. W. Turner of the University of Missouri told feed manufacturers that tests showed how to increase milk production 15 to 20 per cent by feeding hormones, the feed men replied that they'd be interested when he learned how to put hormones in a 100 pound sack of feed. This has now been done, and in southern California farmers are buying complete dairy feeds fortified with hormones.

Feeding hormones is a ticklish proposition. They damage valuable cows when fed in excess.

The hormone that has attracted the most widespread attention among dairymen is Protomone, a synthetic thyroid hormone. The thyroid gland located in the neck region of a cow secretes a hormone whose action reaches every cell in the body. Protomone reacts as though the cow's thyroid gland is working overtime. It increases the rate of oxidation and speeds up the process of turning foods into energy and milk.

Protomone is fed in proportion to body weight, one gram for every 100 pounds of body weight in the cow. The average Guernsey or Jersey cow would get eight to 10 grams a day and the average Holstein or Ayershire cow would require 10 to 14 grams. Herdsmen keep careful tab on their animals to see how they respond to the treatment as individuals. Because a cow's weight determines the amount of Protomone she needs, it seems difficult to develop a ready mixed feed with the proper amount of thyroid for any cow. Professor Turner thinks the most promising way is for feed manufacturers to make Protomone in cubes or pellets for individual daily feeding. He points out that the best time to feed Protomone is after the cow has reached her peak production and started to fall off in milk production. Advanced Registry tests prohibit hormone feeding since the tests are designed to measure the inherent ability of a cow to produce milk.

Hormone supplements are highly interesting but can cause trouble unless directions are followed closely.

Nutrition And Breeding When cows have breeding difficulties dairymen begin looking for the reason. When no other reason can be found the trouble is usually blamed on the feed. The next step is to look around for minerals and vitamins to add to the feed in

(Continued on page 18)

TRUER THAN EVER . . .

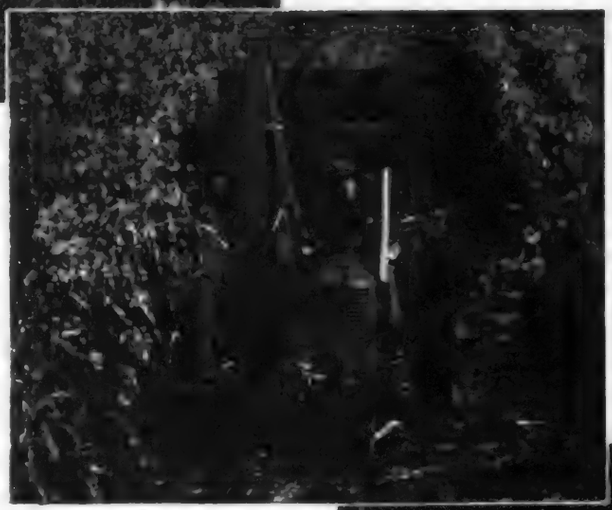
WHEN HELP IS HIGH

t Costs Less to Farm with Case

● Good soil, good seed, and a good season are not enough to get full yield from your land and your work. It takes good tillage and *good timing.* When help is scarce and costly is no time to use a lot of labor. You can do each operation more promptly . . . do it better . . . and do it at less total cost when you have plenty of eager power, teamed up with machinery that's easy to operate, quick to adjust, and free from maddening delays. That's the way to get what counts most in modern farming—not just yield per acre, but low cost per acre and high *yield per man.*

Built for the new century of soil conservation, the Case Centennial plow has clearance and covering ability for fast work in heavy trash and cover crops. The mighty 4-5 plow Model "LA" tractor is fast, compact, and world-famous for sustained economy and low upkeep.

Where combines are best known, the 6-foot Case "A" is famed for capacity to save all kinds of seeds and grains under exacting conditions. Tractor is the popular-priced light 2-plow Case Model "VAC."



Designed from the start for fine work in *both* row-crops and windrowed hay, the Case Forage Harvester is simple and fast. In good silage corn, one man cuts, chops and loads 12 to 16 tons an hour with power from the fast 3-plow Case "DC" tractor.

lave you noticed how many Case owners are men who farmed for years with tractors, often of several makes? more fussy they are about tractor performance . . . the r they keep track of their farming costs . . . the more figures prove that it pays to farm with Case.

ore than a century of experience has taught Case how to what experienced farmers want in plows and in grain- g machines. Tractor-building experience that began 50 years ago has developed the balanced performance brings extra capacity in the varied jobs of farming.

hen you add all that experience to the Case habit of ng every part a bit better than might seem necessary, see the secrets of Case ENDURANCE. It's why Case ines run long years with little upkeep, why Case ors maintain their fuel economy year after year. No ler Case factories are crowded to catch up with over- ming demand.

ere are 20 models of Case tractors, sizes and types to ery acreage, every crop system. That's another reason t pays to farm with Case. Send for latest catalog on the hat fits your farming. Ask for folders on any implements need. See your Case dealer about chances of delivery. Case Co., Dept. A-M-25, Racine, Wis.

With its self-raising hitch the Case tractor spreader hooks up in a jiffy. Balanced for good traction and fast hauling, it makes thin spreading practical, makes manure go further. The full 2-plow Case "SC" tractor has extra power for faster, better farming.

CASE . . . . . .

Fight

"HIDDEN HUNGER"

FREE ACCESS

3 ways

PRE-MIXING

HAND FEEDING

. . . to protect your milk cows, young and dry stock and beef cattle from profit-robbing:

"HIDDEN HUNGER"—*Lack of essential mineral elements needed by livestock for sturdy health, rapid growth, peak production and reproduction.*

Near's MinRaltone protects against this menace because it contains 11 essential mineral elements (plus Vitamin D) which *may be lacking* in the daily ration. Write for free information about supplementary mineral feeding and the 3 WAYS of feeding MinRaltone year round.

NEAR'S FOOD COMPANY, INC. Established 1899 **BINGHAMTON, N. Y.**

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MINERAL FEED SUPPLEMENT
for HEALTH
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2 LB. BROILERS IN 8 WEEKS
WRITE TODAY FOR COMPLETE INFORMATION
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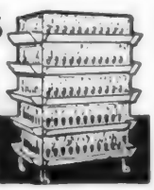


(Continued from page 16)

an effort to cut down the breeding troubles. From S. A. Asdell, College of Agriculture, Cornell University, comes the answer as to the value of the practice. "Where the cows are fed in accordance with recommendations," points out Asdell, "adding vitamins and minerals is of no help in making cows conceive." If, however, the cows have been on deficient diets, feeding the minerals and vitamins which the feed lacks can help make the animal conceive. Lack of Vitamin A may cause sterility, especially late in winter when cows have been fed low grade forage. It's the same old story on dairying: give 'em plenty of good, clean green hay and forget your troubles. Vitamins

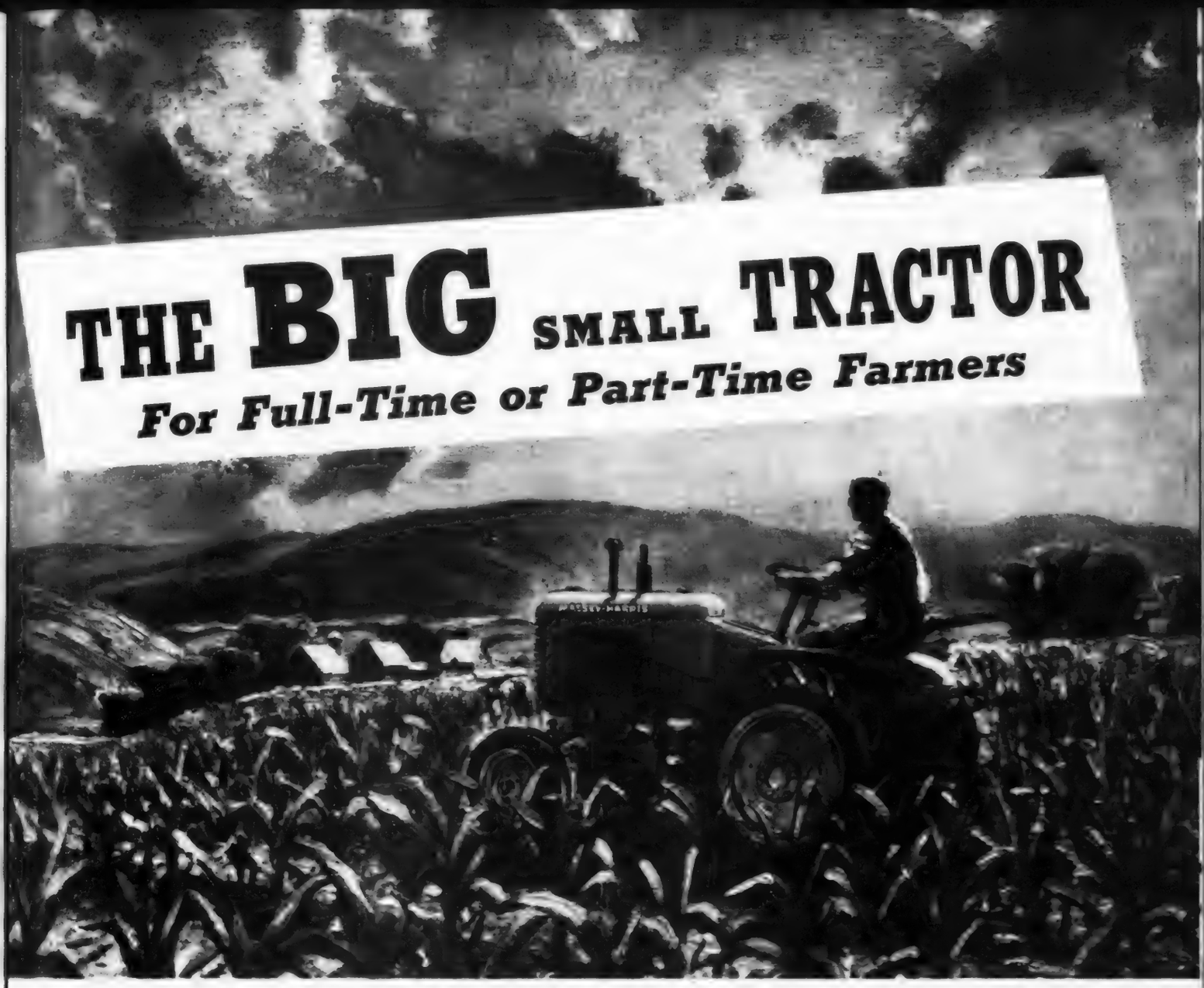
B and C are seldom to blame in breeding difficulties.

Among the minerals, phosphorus deficiency causes some trouble. These cases are rare, however, when cattle are fed high protein grain mixtures, as high protein feed contains plenty of phosphorus. Calcium has little effect on reproduction. Pronounced lack of it may cause deformed calves. The trace minerals, so far as has been learned, have no effect on reproduction.

Curing Suckers Anyone preparing to milk a steady 20 pound producer, and getting only a trickle, knows the low down feeling of wondering if there's a sucker in the herd. The remedies are many but only one seems to be really effective and even this one has its price. This method, which will cure even the old established cases, is an operation on the tongue. The cow is put to sleep with an intravenous injection. One half of the tip of the tongue is removed for a distance of about three inches. The wound is stitched up to control bleeding and hasten healing.

The cow is not seriously hampered for more than the first day. She is unable to wrap her incomplete tongue around the teats. Some veterinarians prefer to slit the tongue. In either case a vet should do the job or Bossy might bleed to death. The operation is usually an inexpensive one, since the surgery requires only a short time. The S.P.C.A. usually does not object, if a veterinarian performs the operation.

Cows with tongue surgery never seem to eat as much as before, which may reduce milk production. Perhaps someday psychiatrists will be able to reason with cows, but until then sucking is only a partially cured dairy evil. ★ ★ ★



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For Full-Time or Part-Time Farmers

The New MASSEY-HARRIS PONY Saves Time...Saves Effort...Saves Money

The only thing small about the Massey-Harris Pony Tractor is its size. In its rugged construction, expert designing and outstanding performance, it is the equal of any Massey-Harris Tractor — BIG tractor operation in a small package. And it comes to you complete — even to belt pulley and electric starting.

It's a joy to be on the seat and watch it perform. Handles so lightly and easily that a boy or girl can operate it. Powered so efficiently it romps along at 2¾ or 3½ m.p.h. with a 12" or 14" plow. Operates so speedily, so economically, it makes part-time farming more of a pleasure than a task . . . brings new economy and efficiency to the small farm . . . adds convenience, lower operating costs to the lighter jobs on the large farm.

Partners with it in performance, economy, and easy handling is a complete line of easily mounted tools . . . designed to do good work, built for long life, and engineered to put on or take off in a matter of minutes.

So, look over the Pony at your Massey-Harris dealer's . . . get on one and drive it, for a new thrill in small tractor performance. For folder by mail, write to Massey-Harris Company, Racine, Wisconsin, Dept. . . . .

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MASSEY M·H HARRIS TRACTORS COMBINES IMPLEMENTS

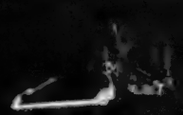
. . . and look at the Tools to go with it

MOUNTED PLOW — A full floating, single furrow plow available in 10-inch, 12-inch and 14-inch sizes.

FIELD CULTIVATOR — Three full-floating gangs, with independent pressure springs for good work.

SPRING TRIP CULTIVATOR — Single row cultivator with 4 front and 2 rear spring-trip shanks.

DISC HARROW — a ten-disc, 5-foot, heavy duty harrow, mounted on husky bearings for good work and long life.



MOWER — Center mounted and driven by the power take off. Hand lift. 5 and 6 foot sizes.

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STOP UNNECESSARY LOSSES—BUILD WITH "PENTA"-TREATED WOOD

Replacing fence posts takes time—time that can more profitably be spent doing productive farm chores.

Reduce *unnecessary* labor and save valuable work time! Treat your posts and other lumber with PENTACHLOROPHENOL—the chemical preservative that protects wood from termites and decay. Penta-treated posts last two to four times longer. and you can treat them simply and cheaply right on your own farm.

Start today to make all your work-time "Profit" time!

1. "Penta"-treated posts last longer
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FREE BOOKLET!

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FARM BOOKS

FOR fifty years "Feeds and Feeding" has been the Bible of American stockmen. In 1898 Professor William A. Henry, dean of the College of Agriculture and Director of the Agricultural Experiment Station of the University of Wisconsin, published the first edition of his authoritative book. At the time of publication Professor Henry apparently had some doubt as to the acceptance of his book by the practical stockmen for in the preface he takes pains to soften the blow to those who distrusted book-learning by pointing out that knowledge, whether it is in the head of the stockman or between the covers of a book, is still knowledge. Following the preface he inserted four pages of practical feeding questions that have caused farmers to scratch their heads in the past and then gave the page reference where the answer might be found. Professor Henry needn't have worried for the book was an immediate success and has since become the accepted authority of practical stockmen and students of animal husbandry.

New editions were required to keep the book up to date. By 1910 the book was in its tenth edition and Professor Henry had secured the assistance of Dr. F. B. Morrison in collecting and analyzing the new information that was being discovered by animal husbandry men and nutritionists throughout the world. Dr. Morrison collaborated with Professor Henry in the preparation of the tenth to fourteenth editions and, upon Professor Henry's retirement, has since continued the work alone.

Now, fifty years after the first edition. Dr. Morrison, who is Professor of Animal Husbandry and Animal Nutrition at Cornell University, has issued a new, 21st edition. The new book has been brought up-to-date in all phases of feeds and animal nutrition since the last edition was issued 12 years ago and has added a new section on the feeding of poultry. The often quoted Appendix Tables which give the composition of American feeding stuffs have been much enlarged and revised and new tables on vitamins and minerals have been added.

Modern Farm Management

During the past century American agriculture has made a great change from production, which was mainly for the farmer's own use, to production for a national and world market. This new agriculture has forced the farmer to become something of an economist and a good deal of a business manager as well as a producer of crops and herds.

(Continued on page 144)

Now Easy to Beautify and Make Fruitful the Home that Holds Your Future

NEW-TYPE "VEST-POCKET" ORCHARDS

will keep a family in fruit—take little more space than a double garage

New STARK GOLD and BURBANK BLACK GIANT Sweet Cherries
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Deluxe Catalog Sent due to shortage of salesmen. 334 glorious art plates. Shows 302 varieties. Many in Life-Like Color. Hurry! While limited edition lasts. **Certified $1.00 Retail Value.**

Fruit Bearing Now "Accelerated"

by Double-Heavy Root System Grafting

of new Stark-Burbank Wonder Varieties — MANY BEAR IN 3 OR 4 YEARS

Luther Burbank

Amazing new developments make it possible for families throughout America to raise their own fruit—to raise fruit in less time—to begin picking fruit in fewer years—to raise fruit of gorgeous color, mammoth size and breath-taking flavor.

Imagine being able to feed an entire family with fruit produced in a vest-pocket orchard — an orchard taking little more space than the ground covered by a double garage.

Imagine stepping a few feet from your doorstep to pick at will genuine Stark Golden Delicious or Starking Delicious apples that would cost 10c to 15c each at a store. Yes, pick them in generous abundance—give them freely for their health benefits to your entire family. This is the new promise held forth by recent developments of Stark and Burbank . . . to realize in your own home yard the thrill of tree-ripened fruit . . . and all you have to do is plant these trees. Yes, only 8 trees of the miracle varieties will fetch the fanciest prices on the market—nine Stark Golden Delicious and genuine Stark Red Starking Delicious apples.

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Success of trees to plant is extremely important because these are the trees propagated from original "Record-Bearing" (Trade Mark) strains endowed with greater vitality, endowed with marvelous young bearing characteristics so that many of them bear fruit in 3 or 4 years. These are accelerated in bearing by grafting on double-heavy root systems by Stark Bro's exclusive Trade-Mark Old Oak Process whole root system and by "fattening" in selected soils before digging. This practically eliminates setback from transplanting. As a result, anyone can shortcut bearing age astoundingly. Fruit is ready to pick almost before you realize it.

Many So Different U. S. Patents Have Been Awarded

But whatever you do, don't confuse this advanced fruit growing with the fruit growing of your father's time. Don't confuse it with the fruit growing of recent years on ordinary varieties of trees because Stark patented or trade-marked varieties are so superior that they are actually like a new race of fruits. Don't confuse these gorgeous big apples with the puny fruit that comes from ordinary unimproved varieties.

Investigate today the opportunity to "own your own" vest-pocket orchard for only $17.60. Why, the fruit from each one of these 8 trees should be worth far more than that.

Gorgeous NEW Book Shows Wonder Fruits in Life Color, Life Size

Take this new opportunity to beautify your home and to make it fruitful. Take this opportunity to give your family the health benefits of fruit without stint, and to save in one year, when these fruit trees grow to maturity, more than you pay for the entire orchard now. See your trees grow in value year after year. Act quickly. Plant this season and gain a year. Pick and enjoy fruit a whole year sooner.

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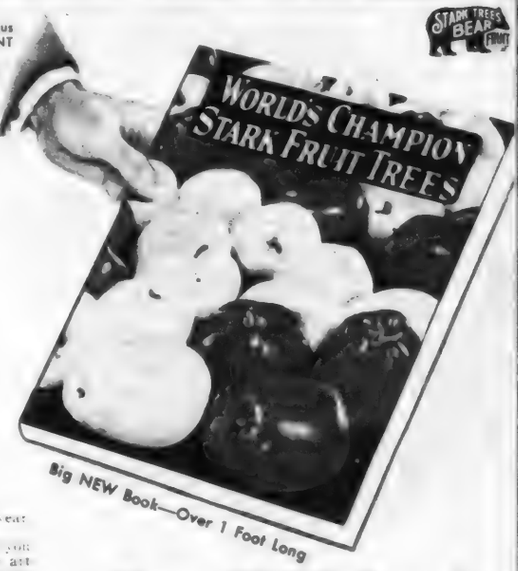

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Cleanest skimming, easiest-to-clean separators ever built. Every part milk touches is stainless steel.

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For better food preservation and better farm living. Improved table fare at lower cost. Beautiful in appearance—dependable and economical.

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Engineered for the dairyman. Supplies 12 full gallons of 185° water. Lifetime copper tank.

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Power farming has made great strides since Allis-Chalmers introduced the first rubber-tired tractor back in 1932. Now comes another big step forward with a new and more efficient farm tractor — the Allis-Chalmers Model WD which utilizes the power of the engine in more labor saving ways than ever before.

Seventeen major new features bring new ease of operation, new versatility, new comfort, new economy and *new performance* to tractor farming. But that isn't all!

Complete Line of New Quick-Hitch Implements

The Model WD makes its bow with a supporting cast of mounted, semi-mounted and pull-type implements—all hydraulically operated and matched to the power, speed and weight of the WD tractor. This combination of tractor and quick-hitch tools means more and better work, with less effort, at lower cost.

It's original. It's quality built. *It's Allis-Chalmers!*

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A single fingertip hydraulic control lever at the steering wheel provides a simple, easy means of controlling the implements.

Two Clutch POWER CONTROL SYSTEM

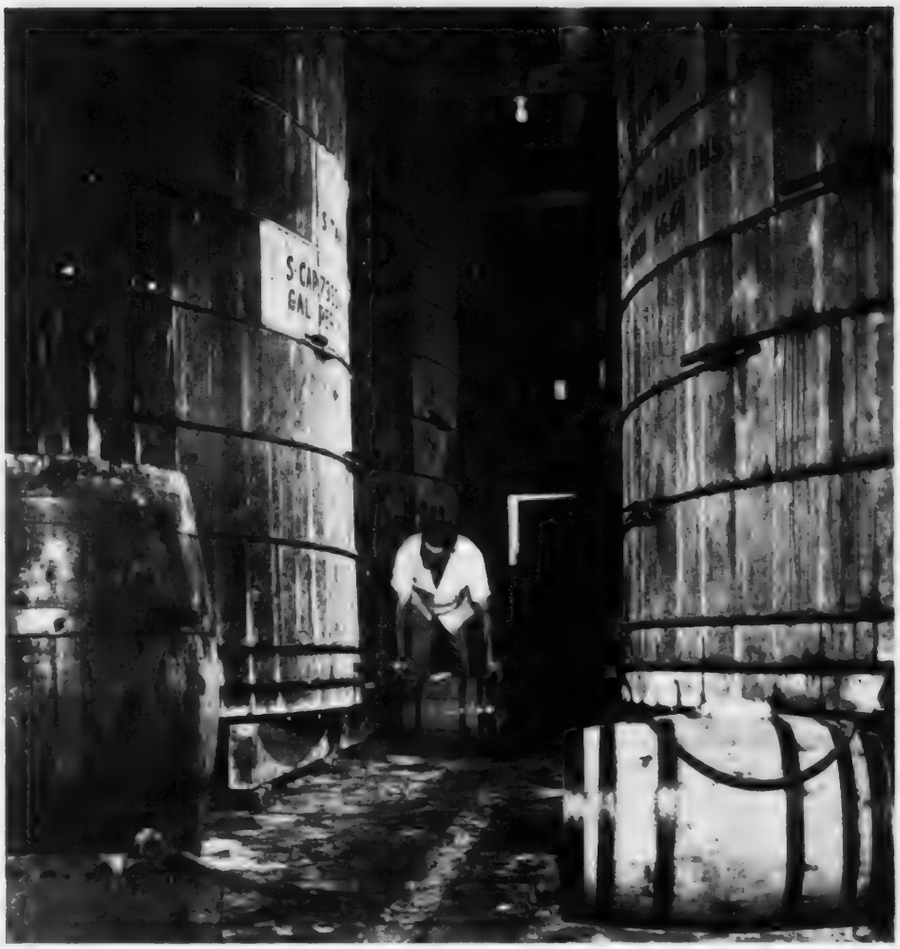
Enables the operator to start and stop the tractor without interrupting operation of the power take-off and hydraulic system.

Power-Adjusted WHEEL TREADS

The power of the engine is used to adjust rear wheel treads to desired spacings—quickly and without lifting.

Seventeen major new features include: new, light pressure foot-brakes; two-way hydraulic shock absorber seat; easier, more responsive steering; more convenient controls; new low-pitch muffler; ASAE swinging drawbar.

Italians from the slopes of the Alps came to Arkansas fifty years ago and built the village of Tontitown. They grow grapes and make wine as they did in Italy. Their energy and thriftiness have transformed poor Ozark hillsides into lush vineyards. The old people may dream of Italy but the young are as American as the "Arkansas Traveler".



OZARK VINEYARDS

BY VIRGINIA FOLLENS

IN THE warm kitchens the men relax over a bottle of wine and a game of *tresette*. There is much work to be done in the vineyards these cold winter days and by evening a man is tired. The vines are pruned of old wood, the trellises repaired, the new canes tied with willow and fennel grass.

Inside the houses it is like Italy although the cars that speed through Tontitown on Highway 68 in northwest Arkansas, see little difference between it and any other crossroads village.

A closer look would show that the pattern in the fields was formed by row upon row of grape vines. On the mail boxes by the road are such names as Tony Fiori, Memo Morsani, Gilo Montegani, or Mano Gasparatto.

Where a side road crosses Highway 68 is a church and school, a general store and post office, and a weathered building that has served in its time as a church and a combination of vinegar factory, fruit drying plant and winery. Roadside oak and elm spread over the few rods of sidewalk in front of the church.

The people of the town are Italian immigrants, their children and grandchildren. As they spill out of the little church after Mass, you might not recognize them as such, for most of them came from farms in Piedmont and Veneto in northern Italy on the foothills of the Alps, and many are as blond as Swedes.

This pleasant town seems far removed from the struggle between the city-states of Italy in the last century, or the battles between the Italians and the barefoot black soldiers of the Abyssinian Negus who defeated the Italians at Adowa in 1896. But it was this constant strife, with heavy taxation and lack of freedom, that drove these people out of their homeland.

As Aldo Maestri, sitting in the pleasant living room of his home in Tontitown, put it, "In the old country there was little freedom and much taxes. You chop down a tree on your own place to keep the family warm, but you must pay for the tree a tax to the state. All the time we hear of America where things are good. No, we didn't think the streets were paved with gold, we just thought of it as a good place to live where good things would happen to us."

Enlarging on her husband's remark, as most wives will, Mary Maestri added, "It is more like the feelings of an old friend of ours who used to live up the street here; whenever she would see the children happy and playing, or the garden filled with flowers, or somebody do something nice for her she would always say, 'Oh, *this* is America'."

In his soft accent Tony Fiori tells a story typical of many. "We were having a disgraceful time," he said, stroking his mustache, "and there was much discouragement. My mother died and my father was raising four boys. Our cow died and my brother's goats got sick. We could not

make the success. My father said, 'We are going to move away from here. I won't stay in this place longer.' He wrote a letter to sons of our neighbor who were living in South America. They write back that things are pretty good there and we decide to go there. We were just about to go when we see this pamphlet from the Mayor of Rome. But . . . ", Fiori held up his hands dramatically and then took a sip of wine to further the suspense, "we hadn't yet bought ticket. This pamphlet tells that Austin Corbin, a millionaire in America, was starting a colony in Arkansas and wanted a hundred Italian families a year to come live. My father wrote to Prince Ruspoli, the Mayor. Real quick he gets answer back to Recoaro, where we live. Our father was a little afraid for all of us to start out together, so he sends Frank and Giuseppe, that's Joe, first. They land in New Orleans and come up the Mississippi River to Arkansas. They write back that things are fine, lots of work, pretty good money. So we start out for America. Early in the morning I go on deck, the boat pushing slowly to America, the fishing boats around us, and behind Genoa, so beautiful."

Their ship landed in New York where they received welcome help in arranging railroad transportation to Arkansas from a fellow counrtyman, Father Pietro Bandini.

Sunnyside in a Swamp

At Sunnyside on the southern tip of the sickle-shaped Lake Chicot in the southeast corner of Arkansas, Austin Corbin was building a colony that was a strange combination of philanthropy and shrewd business. Every necessity had been furnished the colonists: 20 acres of land, a house, farm implements, food, clothing, even a match box. They were issued books of script with which they could make purchases at the company store. In return the colonists were to raise crops of sugar cane and cotton and repay the Corbin Company. They were given 21 years to pay off the mortgages. It was all planned with business-like precision, but there were many things that Corbin did not foresee. The most important of these was his own death a year after the colony started. Corbin's heirs took no interest in the colony. The drainage project which he had started stood unfinished, and mosquitoes swarmed out of the swamps around Lake Chicot. Malaria was a new and strange malady to the colonists. They did not understand it; nevertheless they died of it.

Malaria was not all that sickened them. The cane and the cotton in Chicot County were good crops, for men who took to them. But these northern Italians had always grown their own food and were confused by a system that left only an impersonal credit mark in a book when the harvesting was in.

Deaths from malaria increased; there were few families that did not mourn a loss. Some of the colonists left to find homes eleswhere in America; some who had money went back to Italy; others started for South America. Those who remained were near panic. They wrote letters to the Italian Ambassador in Washington, to their friends in Italy, and even to Queen Margherita. In New York, Father Pietro Bandini, who had met many of these people on their way to Sunnyside, learned of their plight and hurried to help them.

Day of Decision

"In nomine Patri, et Filii, et Spiritus Sancti . . . ", Father Bandini finished his Requiem for the dead and turned to the problems of the living. Tony Fiori remembers the little priest gathering them together and saying, "Let us not be like a rudderless ship sailing wherever the storm blows. If you don't like it here I will look for another place where you can be happy and we will go there."

Father Bandini set out for the Ozark country of northern Arkansas, hoping to find among the hills a more congenial home for these people from the foothills of the Alps. After a careful search he made a down payment on 700 acres of land five miles from the little town of Springdale near the corner of the state that joins Missouri, Kansas and the Indian Territory. Here, he decided, they would live and build their community. He sent for his people, and the village they planned to build he named Tontitown in honor of Henri de Tonti, the Italian lieutenant of La Salle who founded the first European settlement in the state in 1686.

GRAPES MUST BE CRUSHED to free the juice for wine. Some tread them out as they did in Italy, others use a mill. All the families make wine for home use; a few have licenses for commercial wineries.

DISCING A YOUNG VINEYARD to keep the weeds down starts early in the spring. The new vines must be pampered for two years before the farmer gets a crop.

PIETRO MAESTRI and his wife lived in the first house in Tontitown built in 1898. A tornado tore off the second floor rooms but a new roof made it livable again.

BARON des PLANCHES, Italian Ambassador, visited Tontitown in 1905. Father Bandini welcomed him to the community that was beginning to fulfill his hopes and dreams.

Amid Music and Song

As the train carried them away from the cane and the cotton and the malarial Chicot swamps a great weight seemed to have been lifted from the spirits of the colonists. The rackety day coach was filled with the song of the immigrant:

"Quando da Napoli
Fra Suoni e Canti
Vengano dall'Italia
Due Cari Amanti . . . "

It was the same song they had sung on the voyage from Italy. "When from Naples, amid music and song, we departed from Italy . . . "

Waiting for them in Springdale, Father Bandini prayed for these forty families. "They have only their faith to sustain them. Let them hold fast their faith, in God and in themselves."

That prayer has been answered. Father Schaefer, present pastor of Father Bandini's flock, will tell you, "These people have made this country. They have fulfilled a great destiny."

Hooligan Hospitality

Flying rocks and shattered train windows greeted the colonists on their arrival in Springdale as the lawless element expressed their antagonism to these people who spoke an alien tongue and held strange religious beliefs. Physically the Italians differed little from their neighbors. They had the blue eyes and light hair of the Italians of the north, but their foreign dress and speech aroused suspicion and antagonism.

Wise Father Bandini hurried his flock out of town to the wooded tract five miles away where they were to make their homes. Each family was allotted the land and the process of clearing away the oak and underbrush for gardens and building log houses was begun in the raw days of March, 1898.

The First Crop

Memo Morsani tells how his father, Emedeo, and his uncle Adriano arrived in Tontitown. They had $2.00 cash between them and eight mouths to feed. The money was spent at the general store in Springdale where, by pointing and pantomime, they bought garden seed, corn, peas, beans, tomatoes and potatoes. Wild game furnished most of their food until their gardens came in. They grew extremely tired of rabbit.

Emedeo and his brother Adriano, in partnership with three Papili brothers, two of the Bastianelli family and Giuseppe Bisetti, obligated themselves for 80 acres of land at $10.00 per acre. Two horses and a plow were obtained on credit. Young Memo, with his brother Camillo and his cousin Renaldo, worked the crops. The men of the colony went to search for work, leaving the boys and the women to work their farms. They labored on the farms and railroads, and dug coal in the mines of Oklahoma.

Father Bandini became an employment agent, searching out jobs for these men who could not speak English well enough to ask for themselves. Wage-work held no enchantment for them. It was only a means to an end, a way to obtain quick cash with which to make their second payment, and develop their own land.

That year Arkansas suffered one of the worst droughts in its history and the people harvested "not five dollars worth of crop". But they were free from disease, if not from debt, and the land, they knew, would yield them food. "Most important of all, we knew that this was our home and we had hope," Mary Bastianelli said. For the little they had they held a festival of thanksgiving.

The Golden Apple

The following spring fruit trees were set out in addition to field and garden crops. Already they had sent back to Italy for slips and cuttings to plant with their American crops. They planted the fig and chestnut tree from their native Italy, and the American apple trees. The figs and chestnuts died the first winter, but the apples prospered. Fruit would be their money crop, the Ben Davis, the Winesap, the Limbertwig and the Arkansas Black. The whole community was excited with their young orchards. The Morsani family considered themselves lucky. In the fifth year the apples pulled them out of debt. They paid for their land and went into debt for more. Tontitown had added another faith. Faith in God and faith in self were augmented by faith in their land. Each family had its own house on its own farm. A barn-like building had been built to house the church and school and Miss Brady, a teacher from Springdale, came to teach the children to read and write and speak the new language.

We Are Americans

There were those in the community who nurtured their dislikes for the Italians. Miss Brady was heckled for teaching the children of the town and the colonists were taunted by the prejudiced. One night

TONTITOWN'S GRAPE CHAMPION, Toni Fiori, raises a few rows of Fredonia grapes, a variety that matures earlier than his Concords.

a gang, believed to have come from the Indian Territory, came into town, poured kerosene on the wooden school-church and set it afire. Father Bandini himself put out the flames. Part of a rear wall was scorched and burned, but a picture of St. Joseph, hanging on the wall, was not damaged. Since then the church has been named for this Saint.

Father Bandini, angered by this attack, sent a written invitation to his American neighbors to visit the church. When they had gathered he spoke to them in a new and firm tone, "We are all Americans here and I give you notice that we shall exercise the American right of self-defense. There are few men among us who have not served in the Italian army. I am hereafter the Colonel of our regiment, and I assure you that night and day a sentinel shall patrol our streets. Any person coming among us and manifesting malice will be shot." With this strange combination of ecclesiastical and military language the little priest made his meaning crystal clear. The incidents stopped. Antagonism gave way to a new respect for these people who refused to be pushed around.

The First Cash Crop

Within five years Tontitown was a prosperous farm community. When a glutted market caused a drop in the price of apples, the town met the difficulty in typical fashion, as a community. The wooden building that had already served as a church and a school was converted into an apple drying plant and cider works. Only choice apples that brought top prices were sold for table use; the second were dried, the culls pressed into cider. The parings from the drying process and the pulp from the cider presses were turned into vinegar and the remnants of the pulp were returned to the soil for fertilizer. Tontitown received $6.00 a barrel from the apple crop, ten times what their neighbors made.

King Concord

Though apples were the unit of their economy, grapes were the crop of their hearts.

"Whenever you see houses with a few

A SPAGHETTI DINNER for the church brings out the best cooks in Tontitown.

THE QUEEN AND HER ATTENDANTS form a decorative part of every grape festival.

A CLOSE POINT IN BOCCE is argued and measurements made with belts and twigs.

grape vines in the yard," Memo Morsani will tell you in his deep voice, "you can be pretty sure that either Italians or Germans live there. When we started our grapes here in Tontitown we had the experience of Italy behind us. But we were farmers enough to know that the varieties of grapes we grew in Italy might not do so well here. Each man tried a few varieties on his place and observed how they made out. We did not plan it all out but as we talked with one another about the grapes we benefitted by the experience of our neighbors. I would say we tried at least a hundred and fifty varieties this way before we settled on the Concord as the best grape for this part of the country. We still experimented though."

It was well that Tontitown had a second cash crop in the making, for in 1904 St. Joseph's scale attacked the orchards. "We did not know what it was that killed our trees," Memo Morsani recalls, "but it made us afraid. We tried to fight the scale with lye soap, by brushing the lather onto trunk and branch with brooms. It helped, but it was too slow. The trees went on dying." The power spray was developed in time to save the remnants of Tontitown's orchards, but from that time on the apple declined as Tontitown's major crop.

No Time For Lamenting

With the biggest part of the apple orchards ruined, the people of Tontitown were too busy looking for a new crop to spend time moaning over their loss. Again it was Father Bandini who helped them. The little priest called the men together and suggested they investigate the possibility of expanding their dooryard grape arbors to commercial vineyards. A committee was formed and the priest wrote to the manufacturers of grape baskets, to the commission houses that handled grapes wholesale, and to the Department of Agriculture and agricultural colleges. He translated the replies to the committee and to the farmers. The men talked over the report, arguing about it on the church steps, mulling it over in their homes over their dry red wine and out in the fields with their neighbors. They decided to go ahead with the project. As a trial balloon, a few thousand baskets were assigned to a commission house in Fort Smith, Arkansas, for sale. The profits from this first commercial venture encouraged them to enlarge their vineyards, and eventually grapes became the chief crop of the village.

Per Tutta La Vita

While the Concord is not a demanding crop of the soil, and will succeed on a wide range of soil types, it demands year 'round labor. But the people of Tontitown are not afraid of work, provided it is the kind of work they like. This work they love.

From generations of experience the Tontitown growers know that when one plants his vineyard it is *per tutta la vita*—for all your life—and, perhaps for the life

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RELAXED AND GAY the Tontitown farmers celebrate the harvesting of the grapes. For the past fifty years they have held the grape festival which dates back to a special day of thanksgiving set aside by Father Bandini the first summer. The town turns out to watch the grape judging, the baseball games, the carnival and the speeches, and to enjoy a huge Italian dinner in the basement of the school.

TO EARTHWORMS the compost pile is the ideal home. Composters put worms to work because 50,000 of them will turn a cubic yard in 30 days.

For ages gardeners have practiced composting as a way of returning everything to the soil. Now it is gaining favor among farmers.

Home Made Fertilizer

BY DON COMIN

REGARDLESS of whether or not the average farmer is interested in making compost, he sometimes feels there's a conspiracy afoot to force it on him. He finds compost literature in his mail box; his wife comes home from the garden club talking about compost, and the county agent and soil conservation men give it an occasional plug.

It's not that farmers question the value of compost. They have known ever since they first put seed in the ground that humus is good for the soil. To keep the humus content high they have plowed under green crops and spread all the barnyard manure they can save. Regardless of these measures, yields on some farms have continued to drop and erosion has taken its toll of the top soil. These facts coupled with the constant stumping of the compost advocates is convincing farmers that perhaps they should take another look at composting. Perhaps there is something in the idea after all.

The first point that comes up, is the labor angle. Farmers have seen their wives put a handful of compost on their potted flowers or perhaps spade in a shovelful around the cabbage plants. It looks like a plan for the kitchen garden rather than one that can be practical on the large farm. The farmer is likely to lean back against his tractor wheel and say, "Look, I know compost would be good for my land, but, I farm 160 acres you know, and that's no kitchen garden." When he delves deeper into the subject he'll find, however, that with the aid of his modern machinery, there are almost painless methods of making compost on a large scale. Enough farmers have tried it to prove that it can pay off.

There is the case of Frank B. Stearns who owns and operates 114 acres of gently rolling land in Geauga County, Ohio. He raises 60 bushels of wheat to the acre and correspondingly large crops of pasture and garden produce, but never buys commercial fertilizer. "We make our own fertilizer, right here on the farm," he says, "and have been building up the fertility of the soil ever since we moved here 10 years ago. When we first came here I wanted to find out if I could compost on a fairly large scale and make it pay. We're doing it and not working ourselves to death either. One reason we like to compost everything here is because it doesn't let the manure go to waste. Composting is the best way I've found to get organic matter back in the soil."

Stearns is whipping a problem that has confronted farmers for several decades. Organic matter has been vanishing from our soils, and in any productive soil, organic matter plays a lead role.

By increasing the tilth and structure of the soil, organic matter aids root penetration, holds more moisture, reduces erosion, makes for better aeration and reduces baking and crusting on the surface. It makes the soil temperature more constant, especially when used as a mulch. It reduces the loss of water by evaporation. It helps stabilize the pH. Organic matter also supplies food for bacteria and other living things in the soil. The bacteria turn organic matter into plant foods, and help maintain a well

HOWARD MATLOCK, a Dayton, Ohio, farmer says, "The formula for good compost is one fourth animal manures and three fourths vegetable waste." The compost pile should be built up a layer at a time. First spread a six inch layer of weeds or straw, then two inches of manure. On this goes one eighth inch of soil and a sprinkling of lime to keep down acidity. Keep it moist and within a few months bacteria will turn it into fertile humus loaded with plant food.

COMPOST is nature's way of building up the soil. When decay is complete the compost is loose and absorbent. Weed seeds are killed by the heat of decomposition, and vegetation is reduced to a form readily available as food for growing plants.

THE HARD WORKING fields of the truck gardener need heavy applications of manure and compost every year. Compost can be disced or plowed in or applied as a mulch. It helps control erosion, holds moisture and lets air penetrate the soil.

balanced supply of soil minerals including the minor or trace elements. Composting is one method of getting more humus into the soil where it has a job to do.

There are two general ways to make compost. It can either be made in above ground heaps or pits, or it can be incorporated into the soil as sheet compost. The above ground method is used most often for small farms and home gardens. The sheet composting plan is the most practical one for large farms. Let's look at these methods one at a time.

Above Ground Composting

Most compost is made in small piles or pits in the corners of home gardens. Home gardeners are learning that a compost pile has several uses. It makes it possible to put weeds, autumn leaves and other wastes to good use by rotting them down and returning them to the bean and potato patch. It makes a convenient place to dispose of garbage and waste, or dead poultry. Waste paper and old rags will decay in the compost heap.

The true compost convert reaps certain intangible benefits from making his pile. The practice appeals to his frugal nature for nothing goes to waste. Every little weed he pulls from the potato patch is added to the compost pile. Gradually the weeds become a valuable resource in his eyes, he may even develop an almost friendly attitude toward weeds for they have become plants with a promise. For him there is truth in the old quotation that, "A weed is no more than a flower in disguise." In addition, his constant search for weeds keeps the garden clean.

Neighboring compost gardeners usually develop a compost competition. The gardener who makes the most and best compost is the winner. If the sole aim during this competition hasn't become the production of compost, the neighbors may even call attention occasionally to the greenness of their gardens, all of which is attributed to compost. Regardless of the amount of pleasure or drudgery involved in making compost the product is still an extremely fertile dirt. In addition to being a source of pleasure it becomes a source of organic material which was the aim in the first place.

Small compost heaps are not difficult to make for there are no hard and fast rules to follow. Any recipe for making a compost heap can be altered to fit the situation but a good compost pile is usually six feet wide, six to 12 feet long and four to six feet high. It is built in layers. The bulk of the material composing the heap will be weeds, grass clippings, corn fodder, leaves, or any other plant material available. To start the heap spread a six-inch layer of plant material on the ground. On this goes a two-inch layer of manure topped with an eighth of an inch of fertile soil and a sprinkling of lime. The layer is watered, then other layers are added in the same manner until the heap is four to six feet high.

The pile should be kept moist but not soggy. It is not essential to add water to compost and where the water must be carried for some distance it is usually best to let rain water do the job. With no water added the compost will be made slower but the end product is the same.

The compost heap, once completed, and thoroughly wet, will begin to heat as the bacteria multiply. The material is digested similar to the process in the stomach of a cow. The temperature will usually go to 140° F. within a few days and then gradually fall off. This temperature kills all the weed seeds. At its highest temperature it should be just uncomfortably hot for the hand. If it gets too hot it should be sprinkled with water to slow down the rotting process and avoid losing valuable materials by burning.

After the compost heap has heated for about a month it is a good idea to fork it over. To turn the heap start by building a new heap right beside the old one. Fork it over until the whole pile is moved and mixed. This will speed up the decay and move into the center of the pile the material that was formerly on the outer edges. Some home gardeners never turn their compost, pointing out that they would rather wait an extra month or two for the end product than do the added work. Others raise earthworms and after the first heating place a few hundred worms in the pile. These earthworm farmers say that the worms will mix the compost as they eat and in addition will enrich the humus with their castings. Regardless of how the heap is managed, if it includes materials in the proper proportion the end product is still humus. If you never get around to the chore of turning it, don't worry, just allow it more time.

There are choppers that can eliminate the job of building the heap in layers. These choppers, which can be purchased commercially, cut all the material into small pieces and if the manure, soil, chemicals and other wastes are mixed as they are chopped you can forget the layering.

A major problem with many gardeners is obtaining enough manure to make good compost. Manure can be replaced with other animal wastes such as meat scraps, or chicken entrails from the poultry shop.

If none of these materials is available the gardener can still make compost by substituting commercial fertilizers for manures. The fertilizer will supply the nitrogen on which the bacteria feed as they break the vegetation down into humus. A good fertilizer for the job is 5-10-5 mixed equal parts with finely ground agricultural limestone. To each layer of vegetable matter add 25 pounds of the fertilizer and lime mixture for every 100 square feet of area. The fertile soil should still be added after each layer for it contains bacteria which will go to work decomposing the waste material.

To get acid compost for such crops as blueberries make the compost in the usual way, but omit the lime.

THESE FARM SIZED compost pits on the Robert Holt farm in Montgomery County, Ohio, are home made fertilizer factories. They are 10 feet wide by 30 long, and contain 200 concrete blocks. Each of these pits provides compost for four acres.

The walls of a compost pile should be verticle or nearly so and the top should be flat or concave to drain water into the heap rather than off it. It is difficult to make a compost pile with verticle sides without the aid of some type of walls. Some gardeners use a square box-like structure made with scrap lumber. Others construct pits from concrete blocks.

One of the simplest ways to make forms for a compost pile is to use snow fencing such as that often used for temporary corn cribs. These can be set up in the shape the pile will take and once they are filled the walls can be removed and the pile will retain its shape. Some gardeners never worry about using walls to form their compost heaps. They make the sides as verticle as possible without walls and even though the result may not be as beautiful, they usually come out with good compost.

Farmers who make pit compost on a large scale follow the same rules. Robert Holt of Dayton, Ohio, who raises purebred goats, uses only organic composts on his farm. He has four concrete block compost pits that measure 10 feet wide and 30 feet long. There is a constant supply of ruined hay, mowed weeds and animal manures going into these pits as the finished compost is removed and hauled to the fields. The compost pile is built in

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Guinea Fowl

BY GEORGE LAYCOCK

Breeders are turning this barnyard commoner into a highly profitable farm specialty.

THE guinea fowl is a creature of the wild. Farmers have kept them for centuries, but the guineas have never quite accepted the idea of domestication as other fowl have.

Many farm flocks of guineas are small, non-profit producing and more decorative than useful. They either "came with the farm" or are the result of a weak moment when the farmer's wife accepted a setting of eggs from a neighbor. The eggs were slipped under a broody hen who didn't care as long as they looked like eggs. The old hen herded her brood around the barnyard until they started to grow up. The farmer and his wife occasionally said, "Those guineas should be about big enough to eat." But about that time a new element entered the picture.

As the guineas grew older they grew wilder. They started to roost in the top of the sycamore down by the creek. Catching them was too much of a problem, and they earned their keep by acting as watch dogs. Year after year the guineas stayed around but their numbers didn't seem to increase greatly for it was about as much as they could do to keep ahead of the mortality.

A few farmers have started with these small flocks of guineas and built them into commercial specialties. One farmer who has surrounded himself and his neighbors with this barnyard commoner is Will Schadt of Goshen, Indiana. Schadt's reason for raising guineas is sound. He has found that they'll net him a bigger profit than chickens when they're handled right.

WILL SCHADT keeps 3000 guineas on his Goshen, Ind., farm. "Sure they make noise," he says, "But they also make money."

When I stopped at Schadt's farm one day last February, his barnyard sounded like a boiler factory. "I think they're getting noisy now because spring is coming," Schadt said. "Their noise doesn't bother me. Can't say about the neighbors."

Schadt moves around nervously like one of his guineas, but can relax tentatively while he talks. His hair is on the gray side, "But," he says, "forty years of poultry raising will do that to any man."

"Really though," he adds, "I like working with birds, and guineas are one of my favorites. I have three thousand here now and a couple of thousand more out with farmers who are raising them for me."

Guinea breeders have a collection of arguments in favor of the bird. A guinea fowl has a fondness for insects and gardeners don't mind having the birds hunt up and down the bean rows, for, unlike chickens, they aren't scratchers. Throughout the summer a small flock of guineas can hustle all their own feed. They are more disease free than chickens or turkeys. Their loud call helps drive off stray cats, dogs, and other barnyard pests.

Most guineas are raised for meat. They are fine eating, and since colonial times, have been considered a great delicacy in the lowlands of the Carolinas where they are roasted and served with boiled rice. Its meat is much like that of chicken but has a wild game flavor. Exclusive restaurants buy the dressed birds at prices that enable the guinea breeder to clear a dollar and a half per bird when he sells for meat.

Schadt has one of the few commercial sized guinea farms in the country. Most commercial flocks run smaller. "The surface," he will tell you, "hasn't been scratched yet. There's a big future in guineas."

Unlike turkeys, chickens, and ducks, guineas have received little attention from the scientific world. For the most part they are still what they were when the Greeks and Romans raised them for table use before the time of Christ. The market, however, is growing constantly as the public becomes educated to eating guinea fowl.

"They're not too much different from other poultry," said Schadt, "after you learn their habits. I always think the best way to start with guineas is to get a batch of day old keets. Keets are what we call the young ones. The first two weeks of a guinea's life is the critical stage. During those 14 days, heat is more important than food. We start them in batteries here and when they are two weeks old we transfer them to brooders for another six weeks before they are ready to go out on range."

Young guineas can be fed chick starter as soon as they are dry or anytime within

THE PEARL GUINEA, with his white spotted steel blue coat, is the traditional guinea fowl of American barnyards. He is slightly smaller than his white cousin but can be equally profitable when raised for meat on a commercial scale.

the following 24 hours. They need fresh water all the time the same as any other domestic bird. The starting mash should be available to them 24 hours a day for they eat often and in small quantities.

The primary points to keep in mind when starting keets is to keep them slightly warmer than you would baby chicks, about 98° at the edge of the hover, and to keep them from crowding. "If you do that there's no reason why you can't raise everyone you start with," Schadt says.

"A feeding plan that I've found works well is to keep them on starting mash for the first six weeks. Then we add a little more cod liver oil to the diet and keep the oil content high from then on until they're marketed. When they're six weeks old, we start to mix a little grain with the mash. We keep increasing the grain content until the feed is 40 per cent mash and 60 per cent grain. That is the mixture we give to our mature birds. The grain mixture is corn, oats, and wheat in equal parts, and until the birds are mature at five months the corn is cracked. The mash fed to the mature birds is 24 per cent protein.

"The fellow with the small flocks, say less than 50 guineas," Schadt added, "need not spend much time worrying about feeding them after they are a month old. They can take care of themselves if turned out to roam around the barnyard and garden. Most farmers never feed mature guineas except maybe in winter and the guineas do all right, too."

Schadt begins to sell them for meat when they are two months old. They should weigh from a pound and a half to two pounds dressed by that time and will sell for a dollar a pound. Guineas, unlike chickens, don't have to be fattened out before they get their trip to market. They are always ready to kill and forced feeding doesn't speed them along or bring in higher prices.

The Important Egg

A commercial guinea farm's success centers around the egg production, for guinea eggs bring three dollars a dozen from potential breeders. Guineas don't lay during the winter. When spring comes they are anxious to get out of the wintering houses and into the fields. They won't start the season's production until they can get outside and for the first few days after they get their freedom they return to the house to lay. "Once the hens have started they will lay like a Leghorn hen," Schadt says, "almost an egg a day." After they have returned to the poultry houses to lay for a few days they will usually start to lay in the fields. "They're pretty chummy," says Schadt, "and several of

them will lay in the same nest. We've found as high as 150 in one nest where the eggs were gathered the previous day. You have to gather the eggs every day or you'd find a bunch of "setters" on your hands, and your egg production beginning to drop off."

One point that comes up immediately is how guineas can cover a clutch of several dozen eggs. Looks like a big order for a fairly small bird.

"Easy," said Schadt, "they just do the same as they do when laying. They all use the same nest. Maybe half a dozen birds will cover one nest and when the keets hatch they don't know which belongs where, so they all stick together. The incubation period is 28 days."

Finding a guinea's nest is usually a job for a detective, but Schadt has it all figured out. "All you have to do," he explains, "is watch for the males. The males stand guard while the hen sets and if anything comes nosing around he sets up an awful racket. After you've watched the male for a while you can see which direction the female comes from. It's a good idea to stay out of sight yourself if you can for they're suspicious birds."

The eggs should be gathered every day from the communal nests. If they are all taken the birds will abandon the nest so guinea raisers have learned to mark three or four eggs and leave them to keep the birds happy. When the eggs are gathered daily the hens continue to lay during the summer and sometimes produce as many as 125 eggs a season. This egg production is important to the commercial guinea farmer, for he sets them in incubators and hatches his stock for the year. If he has an excess of eggs he can sell them to beginners who want to raise guineas from the egg up. The day old keets sell for 37 to 38 cents each in hundred lots.

"We got wonderful fertility last year," Schadt recalled. "The eggs averaged 85 per cent hatchability. We keep one male for every three females. One with every four is supposed to be enough but we increase the proportion to play safe." The average barnyard flock will get along with a male for every five to ten hens.

Guinea eggs are excellent for table use and guinea breeders think the time is coming when there'll be a demand for them on the market. Few people who try them find any fault with them. They are especially fine for baking, and when cooked have a flavor a little richer than a chicken egg. The yolk of a guinea egg is larger in proportion than a chicken egg. They are somewhat smaller than a chicken egg. When Schadt converted his incubators for guinea eggs he found that the trays held only 20 per cent more guinea eggs than chicken eggs.

Winter Vacation

The big problem in commercial guinea egg production is the guinea's reluctance to work during the winter months. The scientific world has done little with the guinea and consequently there is still not a strain that will lay the year round. "No reason to think," says Schadt, "that we can't get them to lay all year. A few years ago turkeys just laid in the summer. Now we have turkeys that lay all year. Just a matter of time until we have guineas doing the same thing whether they want to or not."

A guinea raiser starting in a neighborhood where the bird is a stranger on the family tables has an advertising job to do before he can expect to sell much of his output for meat. The best advertisement that guinea raisers have found is the bird itself. A few dressed guineas given to the right people will go far in creating a demand. They spread the word about this table delicacy among their friends until you start to get orders from people you never knew. "I never go up town," Schadt tells, "without someone saying, 'hey, Will, you got any guineas to sell?' "

Many restaurants offer guinea breast on their menu and a few of them even sell them for wild game. One restaurant manager wanted the farmer from which he bought his guineas to shoot them with fine buckshot so that patrons biting into the lead shot would know that they were eating wild game.

Guineas are killed in quantity by hanging them by a foot and inserting the point of a knife into the roof of the mouth until it severs the jugular vein and pierces the brain. When the bird dies its muscles relax and it can be picked dry. It should never be dipped in hot water the way a chicken is scalded before it is picked.

Until recently the birds were offered in expensive restaurants with the feathers on. Customers could choose their birds and have them cooked to order. This plan is still followed in a few cases but generally speaking the guinea raiser keeps the feathers.

Schadt sells the dressed birds from his deep freeze by parcel post within an 800 mile radius of Goshen. "Get two and a

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GUINEA BREEDERS SAY "The way to keep guineas from straying is feed 'em." Small flocks forage for themselves in summer and eat with the chickens in winter. Commercial flocks do well on equal parts of corn, oats, and wheat, plus a 24 percent protein mash.

GUINEA HENS refuse to admit they're domesticated. A hen may lay 125 eggs a year, and let the owner guess where.

A PH (ACIDITY) TEST of the rumen contents from the four-legged laboratory, "Chris", (above) is one of the check points that Drs. Gall and Burroughs used to study the helpful bacteria that live in a steer's stomach. A reading of 6.1 to 6.4 indicates the bacteria are active and breaking down cellulose, starch and sugar. These same bacteria are then isolated and grown as a culture in test-tubes. From this work, scientists hope to find what foods encourage the bacteria. The more bacteria, the more easily a steer can digest corn cobs, oat hulls and fibrous foods.

NO PRIVACY IN THE RUMEN

how a steer with a window in his side makes feeding progress for your farm

BY FRED KNOOP

CHRISTOPHER COLUMBUS is a happy, nine-month-old, grade Hereford steer who lives near Reynoldsburg, Ohio. He is happy because he gets plenty of feed, although its experimental nature sometimes makes him eat with skepticism.

Sometimes, too, he gets a little annoyed by his friends' habit of reaching into his stomach and taking out food on which he has put in good time chewing and ruminating. The difference between Chris and all the other feeder cattle at the Ohio Experimental Station is that he has a window in his side. Through this the scientifically-minded (and the curious) may peer and examine the contents of his first stomach, or rumen. His best friends, Dr. Wise Burroughs and Dr. Lorraine Gall, not only look through the opening, but they reach in with glass beakers to take samples of the partially digested food that he has eaten.

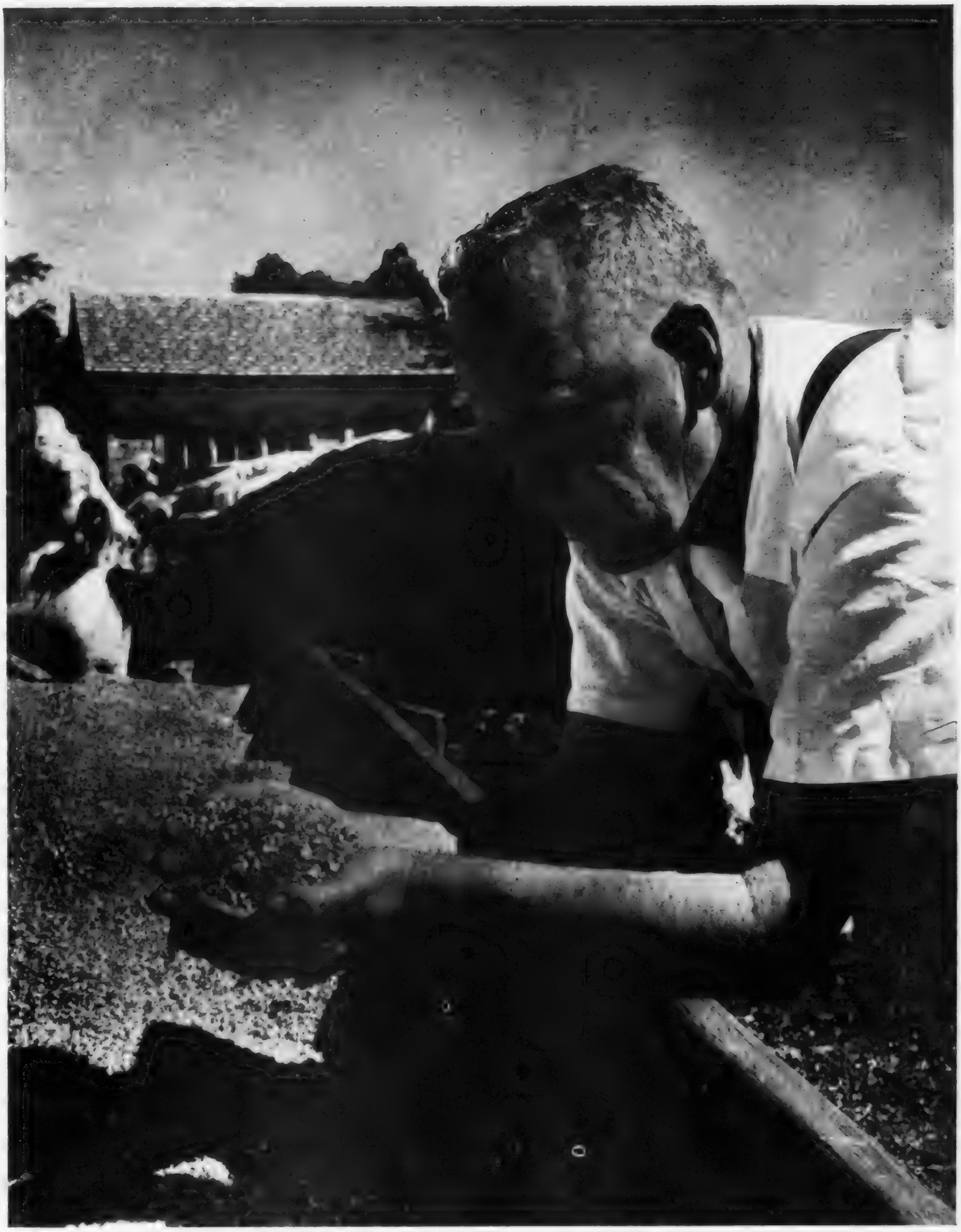
Back of the inquisitive interest of these scientists are the strange and unknown horizons of bio-chemistry—almost as dimly lighted as the inside of Chris' stomach itself. In a world that exists in a space no larger than a point of a pin, scientists think they have the key to a new way of feeding cattle, sheep, goats and all ruminants. A ruminant, in case you are a bit hazy on your animal husbandry, is an animal that chews a cud, i.e. ruminates. More specifically, they chew their food only enough to moisten it and form it into ball-like masses before it is swallowed. The food goes to the first stomach, or rumen, where a lot of things happen to it; it is here that Drs. Burroughs and Gall have concentrated their study. The results are already paying off, and farmers can take the information and save a handsome sum on their feed bill.

What Started It All?

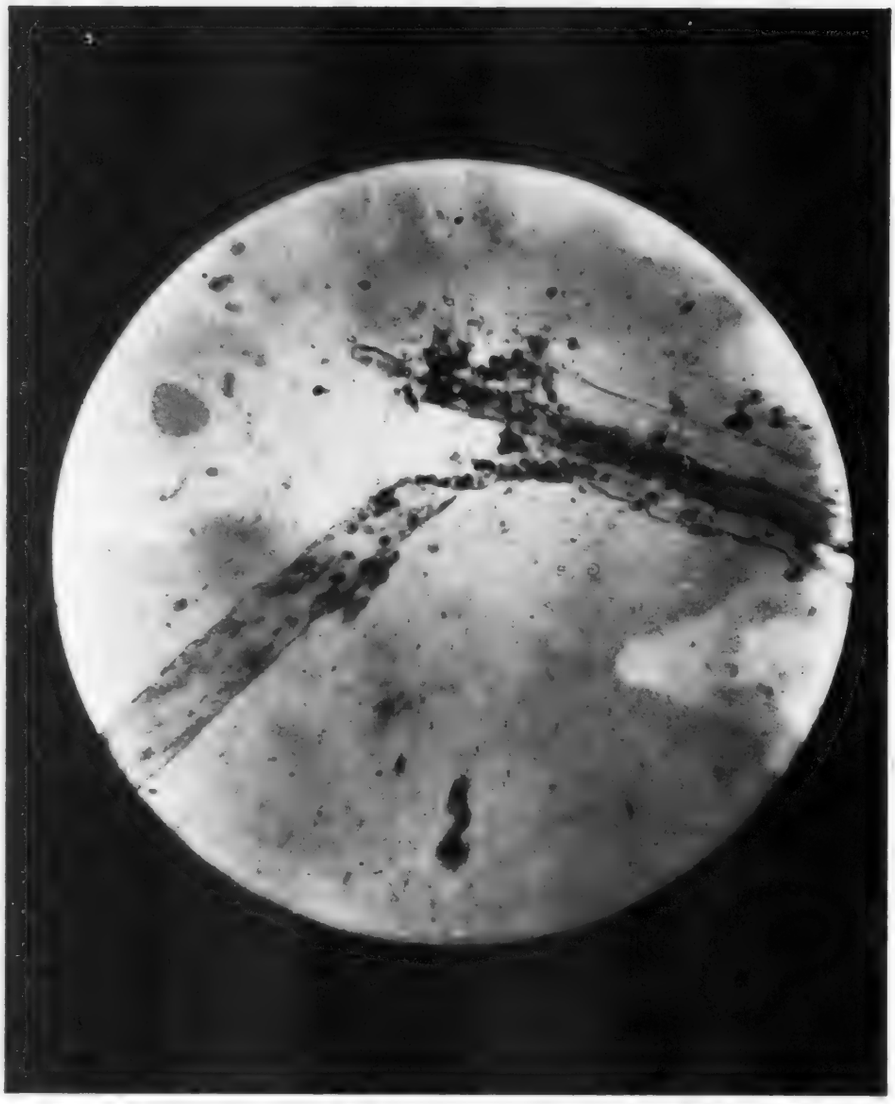
The questions that farmers asked started Drs. Burroughs and Gall on their study of the rumen. "What else do I need to feed steers when I'm giving them plenty of good corn stover?", "Why does ground corn and cob meal work better for cows than it does for pigs?", were typical questions. During the war and long after it every mail brought the question, "What is a cheap protein substitute we can use in stretching our supply of soybean or cottonseed meal?"

To get the answers to these questions and provide the basic information for future feeding trials there seemed one good place to go for the facts—a steer himself.

A four-month old Hereford steer was bought on the open market in Columbus; he was picked on the basis of his quiet, even disposition. Getting inside his rumen called for a window. So Drs. J. H. Helwig and A. S. Shalk of the Ohio State Veterinary College obliged with an operation. First they shaved the hair off his hide in a small area and applied an antiseptic. A local anesthetic was given in the area so he would have no pain and a longitudinal cut made through the hide, the muscular tissue and the peritoneum.



THIS IS Roswell Garst of Coon Rapids, Iowa, who is in the hybrid seed corn business. A surplus of corn cobs and a natural curiosity about the feed value in them made him quick to try out the Ohio Experiment Station conclusions. "Why can't you feed a little extra protein to steers and encourage the bacteria in the rumen", he asked himself, "then perhaps the corn can be eliminated altogether. That is exactly what he has done with his feeders last year and this summer. His feed bill is down and the steers are gaining an average of 1¾ lbs. a day. His feeding ration is given on page 124.



HERE IS what a cellulose fibre from a steer's rumen looks like when it is magnified 1000 times. It would be invisible to the naked eye. Notice that the cocci bacteria are concentrated at the fibre break, in the center of the photograph. The action of the bacteria transforms cellulose fibres into useful food.

Reaching in through the cut, the rumen wall was gripped with a pair of surgical pinchers. This was pulled out through the cut and clamped. Around the edges the rumen was sewed to the hide. In a week that part of the rumen that extended out of the opening sloughed off, leaving a neat opening into the rumen. An oval piece of wood was cut to fit the hole and a rubber flange was made to seal the hole from the inside of the rumen. On the outside a wood block long enough to keep the plug from sliding into the rumen was put over the bolts, and wing nuts were used to hold the block to the plug.

It wasn't long until Chris became the topic of conversation among the farmers in the neighborhood, and soon he was photographed by a photographer from a Columbus paper. It was only a question of hours before Chris was called on by an S.P.C.A. representative. But after Dr. Shalk demonstrated what a healthy, free-from-pain animal Chris was, the investigator decided that he was luckier than most steers—at least he would not be a charcoal broiled steak in a matter of a few months.

Inside the Rumen

In the dark, pulsating mass of semi-liquid food in this steer's first stomach Drs. Burroughs and Gall found an astronomical number of micro-organisms, as many as 90 billion in a gram of rumen contents. [That's a space about the size of the eraser on your pencil.] Somewhat like the bacteria that live on the roots of legumes and help the farmer build nitrogen into the soil, most of these rumen bacteria are friendly busy-bodies. They are anaerobes, that is, they will not live in the presence of air. As long ago as 1891 Zuntz and other German workers had reported on the protozoa in the rumen contents. These are the largest organisms in the rumen and they are the "showmen." They get the first attention because of their size and their active movements. However, their importance in a cow's digestion is now being discounted, because a cow can carry out normal digestion even though there are no protozoa present.

When Drs. Burroughs & Gall studied the rumen contents further, and with a microscope of greater power, they found that there were great numbers of very small bacteria. Of these, two general types have been isolated: rods, looking very much like little sticks, and cocci, which looked like clusters of grapes.

The exciting discovery in this microscopic world was that these bacteria could attack and consume fibers of cellulose, that is, straw, corn cobs, corn stocks and other farm products thought to be of little value. Searching further into the activity of these bacteria it was found that they made a definite contribution to the functioning of the rumen. If we say that they help "digest" the food we are telling only half of the story, for it was found that they could do two things: (1) They could break down roughage and leave it in a form that the cow could use as food and (2) they were converters, that is, they could synthesize the roughage the cow ate into useful feed. For instance, they converted some of the food into the important B-vitamins. They also converted the nitrogen found in hay and other foods into useful proteins that the cow could digest further along in the other stomachs. Since pigs and horses do not have a rumen or any other spare stomach, they cannot make this same efficient use of roughage.

How Urea is Used

In the activity of these bacteria lies the explanation of the use of urea as a useful protein source by cows and other ruminants. For as every high school physiology student knows, urea is given off from the body in the urine as a waste material. How then, can the same material be fed back to the animal as a food? The answer is that it is used by the bacteria and its high nitrogen content converted into useful protein for the cow. The use of urea as a cheap protein source, first tried during the war, is apparently here to stay. Chemical houses, such as DuPont, have perfected an inexpensive synthetic urea (DuPont Two-Sixty-Two), a dry crystaline powder that can be mixed into the feed.

In many tests at the Ohio Experiment Station, it has been found that up to 10 per cent of the rumen contents is made up of these helpful bacteria. In the rumen there are no enzymes; these digestive juices are present in the fourth stomach and the intestines where the actual digestion takes place. If the bacteria are healthy and in great numbers they can break down greater amounts of the roughage: corn stalks, straw, pea and oat hulls and corn cobs, and convert them into useful food. We will then be using products that are wasted on many farms, and it will not be necessary to feed so

much of the grain that can be used by humans: corn, oats, barley and wheat. That makes a sizable saving in feeding costs for all of the ruminants carried on the farm, and more grain can be marketed.

Feeding straw and stover to cows is nothing new for farmers; they have always felt that roughage was necessary to help the digestion. What they didn't know was that there was a lot of good feed value in this bulky matter.

Here then is one case in which the feeding of practical farmers was right and the laboratory work which proved the point came later.

Feeding the Bacteria

It looks as if we have just scratched the surface in our feeding practices. To get best results we will be giving cows and steers, and all of the ruminants on our farms, the rations that will encourage the bacteria life in the rumen. There is plenty of evidence that when animals are on good pasture, which is giving them plenty of protein, that the bacteria life thrives. In the winter when there is no pasture, feeding ample protein in the ration seems to build up the bacteria population. And when the numbers of bacteria are high, fibrous, inexpensive feed can be fed and the animals will do well on it.

The Ohio Experiment Station through the work of Paul Gerlaugh in feeding beef cattle at the same time that the laboratory work on bacteria was being done found that feeder cattle did practically as well on a corn cob meal mixture as they did on straight corn. (*Farm Quarterly,* Autumn 1948, "Feeding Corn Cobs.") This low cost feed mixture was as follows:

Feed Per Steer Per Day

12½ pounds.....corn and cob meal mixture. This was made up of 63 per cent corn grain and 37 per cent cobs. It was made by grinding whole ear corn and then adding an additional amount of cobs equal to the cobs in a bushel of ear corn.

2 pounds——soybean meal (44 per cent). To each 100 pounds of soybean meal, 2 pounds steamed bonemeal, 2 pounds limestone, 1 pound salt was added.

4 to 5 pounds——mixed hay, of farm quality.

Total Roughage Ration

Garst & Thomas of Coon Rapids, Iowa, took the feeding data of the Ohio Experiment Station and in 1947 went a step farther. They eliminated corn from the ration altogether. They fed out 550 steers and were within a few cents of the top of the market when they sold. So much interest was aroused by this winter feeding of corn cobs that they decided to feed a few steers during the summer of 1948, so that visitors could see how it worked. In May 1948, they bought 19 head of cattle averaging 817 pounds and fed them

(Continued on page 124)

THIS IS the sort of thing that annoys Chris. Almost as soon as he eats a tasty new food, Dr. Burroughs comes along and takes it out of his stomach. And almost any time, day or night, someone is likely to be peering into his rumen.

THE SISTERS

BY JOSEPHINE JOHNSON

IN THE Book of Chronicles you will find long lists of "mighty men of valor . . . seventeen thousand two hundred soldiers fit to go out for war and battle" and somewhere buried in the Chronicles will be a little notation that Maachach, the wife of Machir, bore a son and thus produced another host of names of the mighty men of valor. As one wonders about the unknown Maachah, and her so little celebrated life, so one might wonder about and discover the unchronicled lives of the farm women of our grandmother's and mother's and our own time. For them there were and are the ancient and timeless things, the actual creation of the things one needs to live, and from generation to generation on the farm this contact remains the same, although the ways of living are made easier and simpler and the isolation lessened.

Having been surrounded since childhood with many sisters and the moving cloud of skirts of all our mother's many sisters, this old and un-named picture of five women on a farm brings back very vividly a portion of life which had something of that Arcadian glow given only to childhood in the country. Although the stern forbidding faces of these five women are as far removed as possible from the gay and generous natures of my aunts, yet there is a kinship between the stiff expectancy of all old family portraits that reminds us of our own fat family albums. My aunts, much younger than these sisters, lived on neighboring farms near Columbia, Missouri. I recall the sweet dusty smell of the yellow clover in the short stretch of public road between the farms, the hot white sunlight on the stones and the enormous Percherons huddled under a solitary tree switching each other's flies and stamping in the dust.

The orderly succession of days, the sun, the crushed odor of the weeds, the sense of peace, and the feeling of timelessness, gave us as children the notion that the Lord had created the earth and heaven for our benefit.

We stood still and the sun revolved around us. Disquieting evidences that life was not merely an endless pattern of cool dewy mornings, hot fried chicken and starry summer nights were all around us, but we were happy as it is only possible for children to be happy in a small given space of time.

On the dairy farm of my aunt and uncle, the day began at four in the morning, in darkness in the winter, in the first grey light in summer when the pond mists were still cold all over the low places in the pasture. My aunt got up then and served the first of five meals for the day, and for her I doubt the sunrise was always as beautiful and magical a thing as the poets say, especially when it turned the pond waters to a sullen and ominous red with a coming storm, but she would not have chosen another way of life. "Farming," she used to say in the days of the last depression, "is the *pleasantest* way of losing money I know."

I recall Aunt Edith's days as hours of continuous motion, moving from stove to table, from house to barn, from barn to

CAN YOU SCRATCH a farm girl of today deep enough to find the hard stuff of her grandmother? Are these girls sisters under the skin?

THE PIONEER FARM bred an heroic race of women. For them there was little on this earth but sweat and tears. Gaiety and happiness would be the reward of a virtuous life, in a paradise promised by the Good Book.

chicken house. Or riding recklessly in the old model T Ford, bumping wildly over the pastures on some tour of inspection up by the woodlots, or to round up the cows and start them down the dusty rutted road toward the barns. Her dishwashing was the amazement of our childhood. She sloshed every glass and plate through hot soapy water with the speed and delicacy of an express train, landing them on the other side of the sink in an unbroken shower, and got them back on the shelf before they even seemed off the table. She raised chickens, took care of the milk separator (whose intricate mechanism seemed to us children as complicated as the stomachs of a cow), churned butter, fed the wood stove where huge pans of skimmed milk sat souring for the chickens, kept the kerosene lamps cleaned and filled, washed clothes, hauled water, cooked enormous meals whose dimensions had something of the open-handed recklessness with which she did most things.

At one time she kept 18 cats and a little pet skunk that came softly out at twilight, and in the winter the kitchen sills were feeding stations for an endless stream of redbirds, woodpeckers and brilliant, noisy jays.

I remember the sheep barns full of crying lambs, some of which always had to be bottle-fed, and the rows of pig houses in the pastures like large cocked hats or little houseless roofs on the close-cropped grass. Each cow in the herd was always named, and so were the pigs, giving the feeling somehow of a large, though changing, family. Names ranging from simple Annie and Bessie to Sapphira and Hebe, and all the Greek gods and goddesses, and a particularly large and handsome pig was called Agammennon, which seemed fitting to his enormous size.

It is so easy to speak in sweeping generalities, to speak of the rhythms of nature, and the beauty of country life, and the wisdom that people gain from the earth. But there was also, particularly in the generation of these fine, good women, (who seem to be both defiant and suspicious of the camera) a quality almost completely opposed to the large and generous world of nature in which they lived. A hardness and self-righteousness, a narrowness and darkness of outlook. They confused order with integrity, cleanliness with godliness, and set up standards by which each life might be molded and judged with all the exactness of a pound of butter or the recipe for a pie. To justify their own lives they said with the spinster of the "Baker's Wife," "If this erring woman is not punished, what good has virtue done the rest of us?"

It is easy to dwell too much on this other side too, the endless work, the bitterness and the loneliness, the occasional tragedy. One such was the suicide of the little woman we knew very well who lived alone on her big farm with beautiful heirlooms and her herd of cattle, and the finding of her hanging outside in the rain with a rope around her neck. I recall too the words of a farm woman saying, "I keep waiting for something. All my life I seem to have been waiting for something . . ." But somewhere in between the beauty and the barrenness is the truth, and everywhere are the memorable unwritten chronicles of women's lives, farm women whose days have unity and purpose and are identified with the earth, with the most basic things of the world, and who make a contribution far exceeding that of the "mighty men of valor," although their names are not often recorded and their lives are little known. ★ ★ ★ ★

RAMS AND EWES should be kept lean but gaining in weight during the fall breeding season. Fall pastures will ordinarily supply all the feed needed but supplemental grain should be fed to hard working rams and under-par ewes.

THE KENTUCKY WAY WITH LAMBS

BY R. C. MILLER

The Kentucky way of breeding and feeding for an early spring lamb crop can be followed almost everywhere for profit.

FARMERS who send early lambs to market every year skim the cream from the sheep business. They harvest the most profitable product that their farm flocks can produce and get it to market when the price is high. For them lambing comes in mid-winter when other chores are light. By the time their early pastures are ready for grazing, their lambs are ready for pasture. By early summer, the lambs have reached marketing weight of 80 or 90 pounds. In the summer of 1948 a top 90-pound lamb brought $25.

Kentucky sheep men have specialized in this type of management and have gained a national reputation for their efficiency in producing fine early lambs. When cultivated row crops began to drain the fertility from their fields they started a switch to grass in an effort to save the top soil. After they had worked out their own system of sheep management to fit their increased acreage of pasture, they found that profits went up instead of down.

The Kentucky system is founded on the crossing of good Kentucky rams with imported western ewes to produce rugged, fast growing lambs. It has proved its value year after year. "Sheep," said a late president of the Kentucky Bankers Association, "is the one class of livestock that has not failed a single year in half a century to break on the right side of the ledger."

The plan grew out of serious thought and experimentation on the part of Kentucky farmers and research men. It is a good system that will work anywhere.

Doc Stephenson, of Winchester, Ken-

tucky, is nationally known for his fine pedigreed Southdowns and his efficient production of early lambs. He has combined his sheep program with a calf and cow beef herd and the production of tobacco. His farm produces and needs but little grain. Grasses are put to work producing hay and pasture.

From 180 ewes in 1947, Stephenson raised 236 lambs which averaged 88 pounds. These with the wool returned a gross income of nearly $40 per ewe. "Thanks to the higher lamb prices," he said, "the income per ewe looks good, but it is by no means a record. Some of my neighbors did better."

Ewes in Stephenson's early lamb producing flock are all Westerns of the Hampshire cross type and are bred to Southdown rams of his own breeding. Most of the ewes raise six crops of lambs before being sold for slaughter. The flock is culled closely each year and there is an average annual death loss of about 5 per cent. "I have found," said Stephenson, "that the size of the flock can be maintained by an average annual replacement of one-fifth of the original number of ewes. The 60 yearlings I purchased this year are not all for replacements, I am increasing the size of the flock." I noticed the size, bone and good fleecing qualities of the yearlings. "You had to pay for those," I said. "Yes", he replied, "they cost me thirty dollars. More, probably, than yearlings will ever cost again. However, I needed more ewes and these will be more profitable in the long run than others I could have bought for several dollars less."

In emphasizing quality rather than price Stephenson brings out an important point. Some farmers, in an effort to economize on costs buy cheap ewes and end up with a poor flock. It is also false economy to purchase a cheap ram. The man who sacrifices quality in a ram in order to save ten or twenty dollars may lose many times as much when he sends his lambs to market.

While the Stephenson ratio of one ram to twenty-five ewes is about average for Central Kentucky, many farmers use three rams per hundred ewes. Rams of the larger breeds such as Hampshires, Suffolks and Dorsets can serve more ewes than a Southdown, and a two or three year old ram more than a yearling.

All rams and ewes brought into Stephenson's flock, except possibly ewes from the northwest that have not been on pasture since arrival, are dosed with phenothiazine before being turned to pasture. This is just one of the steps in a good parasite control program. Each year, in the late fall, every ewe and ram is dosed with 25 grams of phenothiazine. He prefers the drench to other methods of dosing and administers it with a 2-ounce dosing syringe which holds just the right amount of suspension for a single dose.

To administer the phenothiazine the sheep are penned close enough to prevent them from moving about. As each sheep is dosed it is chalk-marked and all are kept penned until the job is finished. By purchasing the phenothiazine in bulk the cost is only 3 cents a dose. The dose is repeated after lambing, and from early spring to late fall phenothiazine is fed free-choice in salt, in a feeder that protects the mixture from weather and prevents the animals from getting their feet into it. The ratio is 1 part phenothiazine to 9 of salt. The lambs are never dosed except for an occasional one that shows symptoms of parasites. Stephenson is always on the lookout for these lambs and treats them before any appreciable damage has been done.

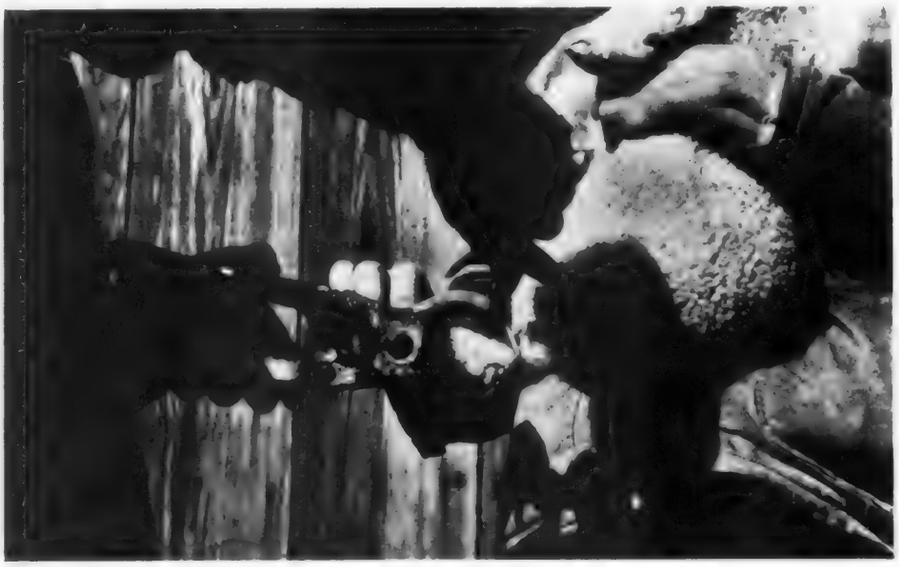
Each year at weaning time, about July 1, the flock is rounded up and each ewe is given a careful examination to determine her fitness to remain in the flock. Any that show unsoundness likely to impair their usefulness for another season are culled and sold for slaughter. All barren ewes except yearlings, which are given another chance, are disposed of earlier in the season. Normally, half or more of the lambs are gone before July and their mothers are on short pasture. Lambs still on hand at weaning time are put on the best pasture available and the ewes on the poorest. "If the ewes are on good pasture at this time," Stephenson says, "they will be harder to dry up and some of them may get too fat for breeding."

The udders of heavy milking ewes are checked about 10 days after their lambs are weaned. If there is evidence of caking they are milked out. Some ewes are milked again about two weeks later. This extra attention saves many ewes that would otherwise be lost.

Early lamb producers have known for a long time that it pays to shear rams before turning them with the ewes. A ram with his coat off is more comfortable, active and serviceable during hot weather.

IN THE OLD DAYS winter lambs usually spent their first hours on a burlap sack back of the kitchen stove. These twins are happy under a heat lamp in the lambing pen.

THESE WESTERN EWES, owned by Doc Stephenson, Winchester, Ky., will be crossed with his own Southdown rams in September. He keeps his best females for replacements.



THE BURDIZO type clamp, essentially a castrator, is used here to pinch the tail and act as a guide for the knife in docking. Bleeding is slight, but it is good practice to apply a blood stopper to the stump as shown in the bottom picture.

Some growers shear their ewes as well, believing it pays off in more lambs and a shorter lambing season.

After each sheep is sheared its feet are trimmed as a precaution against sore feet. The feet are trimmed again after lambing. All the sheep are numbered at this time. Each ewe is numbered on the side or back with a set of 3-inch markers with paint made especially for the purpose. A numbering system makes possible the ready identification of any ewe in the flock and simplifies management. At lambing time the new born lambs are given the same numbers as their mothers, but twins and singles are marked on opposite sides.

As the breeding season approaches the ewes are divided into two flocks of about equal numbers and shifted to good pastures. Throughout the season they are changed to fresh pastures, never remaining more than two weeks on any one field. This not only eliminates close grazing but is good parasite control.

Rams are turned with the ewes the first of September and run with them for about three months. This, Stephenson thinks, is longer than necessary where the ewes are sheared just prior to breeding time. Last season, all but eight of the ewes lambed within a period of six weeks. Stephenson does not paint his rams to identify ewes which have been serviced, because he hasn't time to round them all up every few days to apply a fresh coat of paint. He plans to use a new invention, a paint pad strapped to the ram's brisket, as soon as it is available. The pads, which are interchangeable, come in different colors. The color should be changed every two weeks. A system that enables the rams to mark the ewes they serve eliminates all guessing about the time and extent of the lambing season and, in the case of one ram flocks, is a means of detecting infertile rams early in the season.

The Stephenson flock, like most others in the state, is carried along on pasture alone until late fall. The feeding of roughage is started as pastures begin to fail, and is increased as needed to keep the ewes thrifty and gaining in weight. The roughage is mainly alfalfa, though some lespedeza is used. In any case the sheep get the best and the cattle what's left. One advantage of keeping both cattle and sheep is that the cattle make better use of the coarser and cheaper roughages and herbage which are not so well suited to the sheep.

About three weeks before the first lambs are due, the ewes begin to get some grain. The amount, small at first, is gradually increased until in a few days the flock is getting a half-pound daily per ewe. After lambing, as the lambs begin to take all the milk, the grain is gradually increased to about double that amount. Ewes with twin lambs may need more. For ewes with lambs Stephenson prefers a mixture which in addition to corn includes oats and some oil meal. He has, however, used corn alone

BY THE TIME winter lambs are a month old they will eat grains from a creep feeder. When pasture is ready they will go outside for finishing to 80 or 90 pounds at market time in midsummer.

and considers it satisfactory when the roughage is all good legume hay.

Early-lamb producers, who have plenty of legume hay have a wide choice as to the kind of concentrates to use. Corn or barley, or a mixture of one or both with oats, can be used with alfalfa, clover, or lespedeza hay to make a good ration. Grass silage, now in the picture on many farms, may be used to replace part or all of the hay, but is better if some dry roughage is fed with it. From 2½ to 3 pounds of grass silage will replace one pound of legume hay. Wide use, also, is made of corn silage in connection with legume hay both before and after lambing. Here, however, as in the case of mixed hay, low in protein, a protein concentrate such as linseed oil meal, soybean oil meal or cottonseed meal, should be added to balance the ration.

The Maternity Ward

Lambing quarters on the Stephenson farm, as on most others in Kentucky is a tobacco barn from which the tobacco crop has been moved to a warehouse for sale. The barn is made comfortable and free from drafts by attaching 48-inch high woven wire to posts about a foot in from the walls and filling the space between with straw. Cornstalks or low quality hay may also be used. Some of the ventilators on one side or a door at one end of the barn, is left open for ventilation. Plenty of ventilation and freedom from drafts is essential, regardless of the type of barn used. It is important, also, to avoid crowding. There should be at least 12 square feet of floor space per ewe. The barn should be kept well bedded with straw and, if one that has been used by sheep or other livestock during the season, it should be cleaned and disinfected before bedding.

While sheep are generally supposed to require little labor, there are many long hours put in at lambing time. During lambing time the farmer sleeps with his sheep. At least he must visit the barn two or three times a night for he will often be able to save a lamb or ewe that might otherwise die by morning. This especially is true in very cold weather.

Heat is important for weak lambs. Farmers with small flocks often take their lambs into the kitchen until they are thoroughly warmed. Others have brooders rigged up in the lambing barn where they can put lambs under a reflector type heat lamp for a few hours.

Timely assistance to any ewe or lamb that may need it, helps insure marketing a high percentage of the lamb crop. Even with the best of care and attention some lambs and possibly some ewes as well will be lost. A lot of the success of raising early lambs depends on the condition of the ewes at lambing time and on the preparation that is made for lambing, such as fitting the barn for warmth and freedom from drafts and the building of lambing pens.

Many ewes, especially those older than yearlings and carrying more than one lamb, are needlessly lost from Ketosis because they are not kept gaining in flesh during late pregnancy. "I slipped up on this one year," said Stephenson, "and lost a number of ewes. I judged them on appearance instead of feeling their backs." Ewes heavy with lamb and several months

(Continued on page 126)

MULTIFLORA PLANTS can be set at the rate of five to ten thousand plants an hour by converting a tomato or tobacco planter.

LIVING FENCE

BY CARRINGTON H. BURGESS

FENCES are expensive, and going higher. It takes a lot of time to put up a fence, even if you have the money, and you can look forward to the annual chore of keeping it in repair.

Now, if you could grow your own fence, a fence that would last a lifetime, require little or no attention once it is established, and at the same time have a thing of beauty, you would have the answer to a farmer's prayer.

Rosa Multiflora, or Many-flowered Rose when reduced to English, is one answer to the fence problems that has come out of the experimental work of the Soil Conservation Service. It does its job so well that nurseries are having trouble supplying the demand for plants.

Multiflora Rose is cheap, it is an effective barrier for every kind of livestock with the possible exception of hogs, and it is also a wildlife refuge, a barrier, an efficient erosion control, and a thing of beauty.

In an attempt to find a suitable plant to replace the Osage Orange, once called "God's gift to the prairies," but in late years called less complimentary names, Botanist Hugh Steavenson of the Soil Conservation Service Nursery Division in the upper Mississippi Valley made initial trials of plants, widely selected from native and introduced sources, at Elsberry, Missouri. Tests of conspicuous species and varieties were made on 30 distinct problem areas in Missouri and Illinois. The Asatic Rose, a Multiflora won over all other contestants and in 1934 Steavenson planted test rows along the borders of the U.S. Soil Conservation Nursery at Elsberry. Later it was taken out and given a thorough trial as a living fence under actual farming conditions.

Unlike Osage Orange, Multiflora Rose is a shrub, hence it occupies much less ground. It attains an ultimate height and spread of six to eight feet, requires no trimming to keep it in bounds, and, unlike Osage Orange, offers little competition to adjacent crops. Its vigor, particularly on the poorer soils, greatly surpasses that of the Osage Orange. Multiflora is colorful in flower, bearing an abundance of small, white or dusty pink flowers which bloom about the same time as other roses. These are followed by masses of berries which turn red and persist through the winter, producing a welcome diet for birds during the lean months.

Multiflora Rose has a special value as a divider between fields farmed on the contour, serving as a fence, a contour guide, and an erosion buffer strip. Living fences are better adapted than wire fences for contour planting.

During the Missouri experiments hedges three to five years old and at various spacings on both hills and bottom land were tested with cows, young calves, horses, sheep, goats, and hogs. Animals were en-

closed in paddocks for two to ten weeks and their behavior closely watched. During the tests, normal rations were reduced at times to encourage the stock to break out in search of food.

Horses, cows, and calves were confined by all barriers tested. Sheep and goats usually were confined, but were apt to eventually find openings in the three and four-foot spacings. Sheep and goats browsed the foliage, but only the tips of the branches, because the plant is well protected by thorns. Hogs proved the most difficult to hold because of their ability, when not ringed, to root under the arching branches and take advantage of low openings between widely spaced plants. Brood sows and shoats were confined for several days by four and five-year hedges with plants spaced three and four feet apart.

Spaced at one foot apart, Multiflora Rose fence successfully confined cattle and horses at the end of the second year and this spacing will probably confine hogs in time. The Missouri Conservation Commission says planting six inches apart will positively turn hogs. Multiflora Rose confines livestock primarily by density of the stalks and by its thorns. The drooping rose canes with their heavy green foliage also aids and may prevent the livestock from even reaching the main barrier consisting of heavy, thorny canes.

Albert J. Milde, of Jackson, Missouri, has a mile and a half of Multiflora Rose hedge in various stages of growth, with the oldest being about six or seven years old. He uses it to divide fields and to fence out terrace outlets which he wishes to graze. Milde says Multiflora Rose will turn any kind of livestock except hogs. "In most cases," he says, "it turns hogs, but you generally have a 'breechy' sow that will go through anything."

Milde lives in a soil conservation district that is thoroughly sold on Multiflora Rose. In 1947 the Service furnished farmers in the district with 22,000 seedlings, and in 1948, with 54,000 seedlings.

John Priest, also of Jackson, is another Multiflora Rose booster. "If it would hold hogs it would be a perfect fence," he said. He has a half mile of hedge, set out in 1942, in use as a living fence. He set out 3,000 plants this year and expects to set out 4,000 next year. Priest's hedge has a height and spread of eight to nine feet.

Multiflora Rose is ideal for fencing in small areas, slopes, dips and irregular lines, such as ponds, drainage systems, gullies, ditches, woodlot borders, wildlife areas, and contour ditches, and is recommended as a firebreak because there is no grassy growth beneath its branches.

If a farmer has a thought for the wildlife on his farm he will find Multiflora Rose just what the birds and the little animals want. The Rose fence makes an excellent base for strips of Sereca and Korean Lespedeza. This legume cover, which also provides food, together with the Rose offers all that could be desired in food nesting, escape, and winter cover for quail and other farm game.

Farmers say wildlife swarms into the Multiflora Rose hedge. Song birds and quail feed on the hips, or berries, and the shrub furnishes excellent cover. Low nesting song birds like the fence unusually well for nesting purposes, as evidenced by the number of old nests visible after the foliage is gone in the fall.

Old fences which need replacing or extensive repair can be rehabilitated by planting Multiflora. The Rose will fill in the gaps and add its barrier to what is left of the old fence to make a stock-tight line in a short time. The old fence also serves as a protection while the planting is getting established.

THE WHITE OR DUSTY PINK blooms come out about the same time as other roses.

The Habits Of The Rose

Multiflora grows from seed and to a certain extent by layering. However, it is only under ideal nursery conditions that the seed will germinate. This is a blessing in disguise for the farmer because plantings do not spread. It does not "sucker" and the density in the fence row comes from new shoots growing directly from the crown. Each year some of the old canes die and new ones take their place. The old and new stalks combine in time to form a dense, matted, forbidding barrier to man or beast.

Occasionally a seed that passes through a bird will germinate, the digestive processes of the bird scarifying the seed enough to permit it to grow. The canes will grow by layering, that is, will take new root if covered with soil along their length. This rarely happens, with the result that a Rose fence will spread only its

THE FRUIT of the Multiflora is a prolific source of food for wild life during the winter months.

A FOUR-YEAR-OLD PLANTING OF Multiflora separates a pasture from a field of soy beans.

COST COMPARISON

Woven Wire Fence vs. Living Fence
Per 100 Rods

WOVEN WIRE		LIVING FENCE	
Materials:[1]		*Materials:*[2]	
Woven wire, 26" @ $0.60 per rod	$60.00	Plants, Multiflora Rose, 1650 (1 foot apart in single row) @ $29.00 per M	$47.85
Barbed wire, 2 strands @ $5.50 per 80 rod spool	13.75	*Labor:*	
Posts, line, 1 per rod @ $0.40 each	40.00	Site preparation	
corner and brace, 2 sets @ $3.00 per set	6.00	Plowing, 2 man-hours @ $0.50 per man-hour	1.00
Labor:		Discing, 1.5 man-hours @ $0.50 per man-hour	.75
Fence construction		Planting, 33 man-hours (1650 plants @ 50 per hr. @ $0.50 per man-hour	16.50
70 man-hours (0.7 man hrs. per rod) @ $0.50 per man-hour	35.00	Cultivating, 4.5 man-hours (three cultivations) @ $0.50 per man-hour	2.25
Land:		*Land:*	
0.15 acre @ $100.00 per acre (4' wide x 100 rods long=0.15 acre)	15.00	0.375 acres @ $100.00 per acre (10' wide x 100 rods long=0.375 acre)	37.50
TOTAL COST	$169.75[3]	TOTAL COST	$105.85
ANNUAL MAINTENANCE AND REPLACEMENT COST: (6% of cost of labor and materials	$ 9.88)	ANNUAL MAINTENANCE AND REPLACEMENT COST:	Negligible

[1]At 1947 prices.

[2]Commercial nursery price for good quality stock, spring 1947. If plants cost less than $29.00 per thousand, reduce total cost by the difference: If plants can be obtained from government sources (at $6 per M) and if the farmer does the work himself and does not mark off land value, he can put in a mile of Multiflora Rose fence for as little as $100. The cost of an equivalent wire fence will run $500 to $700.

[3]A 3-strand barbed wire fence would cost $111.62 with annual maintenance and replacement costs of $5.80.

THREE MULTIFLORA BUSHES planted 15 in. apart grew into this stock-tight barrier.

normal overhang of about four feet from the crown and will confine itself to this space indefinitely.

The root system is very modest and grows mostly downward. Unlike the Osage Orange it does not send out robber roots into the farmer's corn field to suck the fertility out of the soil. The roots are fiberous and will hold soil in an iron grip, preventing washing or erosion.

Multiflora Rose grows rapidly. In three years, on good land, the shrub will form a barrier. On unfavorable sites, it has reached barrier size in four to six years.

It will not make vigorous growth where it is over-topped by trees, and barrier plantings around woodlots should be at a reasonable distance from the trees. It is not recommended for planting next to orchards, because Multiflora Rose and fruit trees are closely related, and it is possible that disease and insect pests common to both might cause trouble, particularly to the orchard trees.

The shrub is easy to transplant and there is almost no mortality when transplanted in a dormant condition. It can be planted in early spring or in the fall. Early spring growth is characteristic, however, and it suffers heavy shock if planted after the buds break. On more porous soils, best results are secured from late fall plantings with mulching. The plant prospers best under a heavy mulch regardless of the planting season.

On the tighter soils early spring planting is best unless a heavy mulch is applied, in which case fall planting is satisfactory.

One year seedlings of Multiflora Rose seem best for planting. They can be produced readily in a nursery at about the cost of black locust seedlings.

For fence plantings to form a livestock barrier a single row with the plants spaced twelve inches apart is recommended. If hogs are to be confined, a low wire fence can be stretched to form a protection for the young plants and at the same time insure against penetration when the fence is established. The best method for ground preparation is to back furrow an eight to ten-foot strip on the proposed fence line, disc down well, and plant on the back furrow. Seedlings can be hand set against the vertical berm of the furrow, and a handful of dirt pushed against the roots to hold the plant erect. Dirt is replaced by reverse furrowing, and packed by running the rear wheel of a tractor or a heavy roller along each side of the planted strip within two or three inches of the seedlings. One man on a tractor and one man helping can plant 500 plants per hour by this method. If a tobacco or tomato planter is used, the site would have to be plowed and harrowed and then two men riding the transplanter and one on the tractor could plant from five to ten thousand plants per hour. After setting, the tops are pruned back to about two inches above ground.

Hay, straw, cane choppings, or sawdust may be used as mulch. Weeds should be

kept down to allow the young plants to get a good start. Mulch should be renewed each year for the first two or three years or the fence row can be cultivated when necessary from early spring to midsummer.

With satisfactory growing conditions, two or three years of such cultivation will be sufficient, and lespedeza and grass may then be sown or allowed to grow on the strip. After the plants reach maturity and the growth gains density it will be an effective weed control (in itself). This is one of its virtues. The chore of keeping down weeds along the fence row will be taken over and the farmer can go to the ball game.

If livestock is roaming about, the new planting should be protected by a temporary fence. Missouri farmers are using an electric fence for this purpose. Gaps or blanks where plants have not taken hold must be filled in the following season to insure a fully-closed fence.

It is best to set posts for gates and gaps at planting time to save working among the thorny branches later.

Where To Buy Plants

Plants are available through commercial nurseries, through the U. S. Soil Conservation Service and through the various state game and fish department nurseries. The Soil Conservation Service distributes some plants without cost. Most of the state conservation departments charge a nominal fee for the plants. The commercial nurseries naturally object to being underpriced by the government nurseries and point out that a large scale demand for plants can only be supplied by themselves, although many of them report they may not be able to supply current demands this year. Among the reliable commercial nurseries selling plants are:

C. L. Vanderbrook & Son, Manchester, Connecticut; Farm Landscape Company, Box 230, Urbana, Illinois; Forrest Keeling Nursery, Elsbury, Missouri; C. R. Burr, Manchester, Connecticut; Brownell Roses, Little Compton, Rhode Island; Arthur Dummett, 63 Anderson Road, Bernardsville, New Jersey; Brown Brothers Company, Brighton Station, Rochester 10, New York; Boulevard Nurseries, Newport, Rhode Island; Brookville Nurseries, Glen Head, New York; Fairview Evergreen Nurseries, Fairview, Pennsylvania; Musser Forests, Inc., Indiana, Pennsylvania; Springhill Nurseries, Tipp City, Ohio.

Diseases and Range

Multiflora Rose, like all roses, is subject to numerous diseases and pests, such as leaf spot, mildew and rusts, scale insects, leaf miners, and others. No serious insect pests have been observed to attack Multiflora Rose, but various diseases, and common leaf eaters, such as grasshoppers, cause some defoliation by late summer.

Multiflora Rose is adapted to a wide variety of soils and situations, but will probably not form a barrier on badly eroded claypans or droughty sands and gravels. Fertilization is of little advantage.

The plant is generally considered hardy to the northern boundary of Missouri, the central parts of Illinois and Indiana, and throughout Ohio, but there are numerous older plants much farther north. Even at Brookings, South Dakota, the species persists and makes vigorous growth, although many branches kill back.

The two objections to the Multiflora Rose most often heard are that it will not turn hogs effectively and that it does not become a stock-tight barrier until it is two or three years old. The answer to the first will probably be solved by closer planting. The only remedy for the time element is to look ahead and start your fence two or three years before you need it—or develop the virtue of patience.

A minor objection is that you can't cut across fields to visit your neighbor if you have Rose fences. On the other hand, if you're feudin' with him, a Rose fence is a blessing and a comfort. ★ ★ ★

LIVING FENCE, OLD STYLE

The old Osage Orange hedge sapped the ground of moisture and plant food for a distance of twenty feet on either side.

LIVING FENCE, NEW STYLE

The foliage of the Multiflora kisses the corn leaves but the stalks here grow as tall and heavy as any in the center of the field.

HOT STUFF

BY VIVIEN KEATLEY

A spice salesman takes red peppers and an Arizona town out of debt and makes the nation's chili taste better.

TEN years ago Stewart L. Brockman was trying, unsuccessfully, to sell California chili peppers in Arizona. Today he is the undisputed Chili King of the Southwest because, as sales manager of one of the country's largest spice and coffee firms, he knew a thing or two about coffee.

It puzzled Brockman that neither he nor any of his salesmen could sell chili pepper in Arizona, since every cook in the Southwest slips a little hot stuff into nearly everything except ice cream and cake. The reason Arizona cooks preferred the local product to the California brand was discovered when a dinner host served him some "real chili" seasoned with a locally grown product. Brockman spent the evening with an ice cube in his mouth.

"I'd been sampling and selling pepper for twelve years," he said, "but after that bowl of chili all other pepper had just about as much flavor as a pulverized button."

Brockman, who knew about the amazing sectional preferences in coffee blends, began to wonder if the same thing wasn't true about chili pepper. Californians of course knew that their home-grown variety, a very dark red in color, was, like everything else grown in California, the "best in the world." Since they use a lot of chili, production was large-scale and well-organized. They were using a lot of chili in the rest of the Southwest back in 1937, too, but none of it was grown in California. It was grown in Arizona, but in that area production and distribution was so badly organized that prices and supply were as temperamental as a prima donna.

Nobody outside California took chili farming seriously. It was a side-line which might or might not show a profit, and farmers grew it haphazardly in small plots in Louisiana, Texas, New Mexico and Arizona. Every section wanted chili pepper of a certain kind. In southern Arizona they liked their own mild product; in Texas, some sections wanted a red hot product and others wanted it mild. But everywhere they wanted it a bright red—except in California.

Chili is like coffee, in that there are a hundred subtleties of flavor, depending on

(Continued on page 130)

MINERAL FEEDING

Farm stock will gain faster, produce healthier young, and have more resistance to disease if they have the proper mineral ration. A practical hog man tells how and when to feed and how much to pay for minerals.

BY J. S. COFFEY

ONE doesn't need to be an old-timer to remember when farmers believed that the only feeds necessary for farm stock were pasture and grain. Now there is scarcely a stock raiser anywhere who doesn't feed supplement and minerals in addition to grain and forage. The advantages of a high-protein supplement is so readily apparent to the naked eye that no farmer would go back to the old corn-pasture menu for his animals. But the signs that minerals help stock are not so rapidly apparent and it's agreeably surprising that farmers have accepted the need without more evidence of profit. That's not ordinarily like a farmer.

The use of minerals, and that includes salt, is a comparatively new practice, and the general acceptance today of the need of minerals speaks well for the selling job done by animal nutritionists and feed and mineral dealers. Indeed there is some evidence that farmers have been over-sold on minerals and have been high-pressured into paying fancy prices and over-feeding.

Just what is the value of minerals in the ration, how much should be fed, how much should be paid for them, and what happens when there is over-feeding and under-feeding?

It might be wise to start the discussion off with a basic statement that there are very few farms in the country today which are not lacking in one or more of the minerals necessary for the health and well-being of farm animals. Virgin soils might be sufficient, but a patch of soil in the Midwest that has not felt the heavy hand of man is as rare as a Democrat in Maine. Every farmer can safely assume that the feed and pasture grown on his own place, or bought on the market, needs some mineral added to keep his stock healthy and growing.

Any high school boy will tell you there are about a hundred elements. Some are downright poisonous, some are harmless, and a small number—scientists haven't agreed on the exact number but it's around a score — are necessary to the growth and health of man, animals and plants. Once upon a time, before man farmed the life out of his soil, it held all, or about all, the necessary elements and passed them on to the animals by way of the plants they ate.

This isn't true any more. The Big Three, nitrogen, phosphorus, and potassium, we all know about and we add them regularly in the form of commercial fertilizers or manure. Some of the others have a less-apparent role to play in the drama of life and growth; the evidence of their lack or deficiency is not so immediately apparent.

Take iodine, for instance. Lack of iodine causes upsets to the thyroid gland and goiter may result. Young pigs in the so-called goiter belt of the Midwest are often born with pronounced goiter or are hairless. Lack of calcium may cause rickets or poor bone development, which in the later life of the animal may cause it to "go down." Lack of a number of elements may cause upsets in the reproductive abilities of the animal. They will not settle or they will have irregular heat periods.

Those elements which are used by plants in large amounts and which are being rapidly depleted by erosion, leaching and cropping are being put back in varying amounts, as was said before, in the soil by way of fertilizers and manure. Those elements which are needed in lesser amounts have been overlooked until recently and are now being given to the animal direct in his feed by way of mineral mixtures.

The expected question from farmers is: why not mix these elements in my fertilizer, get them into my grain and grass, and into my stock in this easy way? This can be done practically and profitably only with a certain limited number of minerals — those that increase plant growth. This is true of calcium (that is why we lime our land) and phosphorus. It would be too expensive to add all the trace minerals in this manner. It's cheaper and more effective to add them to the feed. Farmers attending the Farm and Home Week at Ohio State University in 1948 heard Dr. T. S. Sutton say, "Where such elements are lacking they should be supplied in the feed and not as fertilizer to the soil. This is too expensive and inefficient. A common rule is that unless an element applied as fertilizer increases the yield of feed, it shouldn't be used. Some elements are necessary for animal nutrition, but not for plant growth."

Some elements necessary to animal health and growth are present in such large quantities or are needed in such small amounts we don't need to worry about the present supply in the soil. Fluorine is one of them. Most phosphates

MINERALS can be fed free choice or mixed with the supplement. If fed free choice care should be taken that mineral-starved stock do not get too much at the start. The correct amount, weighed and mixed with supplement, takes the hazard out and is less expensive. Salt can ordinarily be offered free choice.

THIS REGISTERED GUERNSEY CALF was bought in a group of animals purchasd for 4-H Club members in Jackson County, Wisconsin, and went to a girl member who lived on a farm of cut-over timber land, low in fertility, the nutritive materials drawn from sand rock formations. The calf was a purebred and had evidently been well nourished up to the time of changing to food from this poor land.

Nine months after the calf was taken to the farm the left knee was enlarged, which made the calf lame. Those who saw the calf thought this trouble was due to some injury or malformation. During the next 8 or 9 months, which included the winter when the calf was kept in a dark, bank barn, it lapsed into a complete breakdown as shown above. Unable to obtain sufficient minerals from the feed, the animal drew essential phosphorus and calcium from the stores in its bony structure. Dr. Veach, head of the Veterinary Department at the University of Wisconsin, stated that the trouble was, in his judgment, due to two factors: (1) That the soil did not deliver the proper nutrients into the plants fed the animal, and the animal was not fed a mineral supplement; and (2) that the calf, staying in the dark barn, did not get sufficient sunlight to enable it to synthesize Vitamin D, which is basic to the metabolization of phosphorus in the body.

contain fluorine unless treated to eliminate it. Fluorine is needed in a microscopic amount for the health of the teeth. Too much of it is harmful. Care should be taken that stock do not get too much phosphate if it has not been defluorinated.

Symptoms of Deficiency

If you reduce the amount of protein in a hog's ration the effect is apparent in a few days; if you take salt away from him you can be sure you made a mistake when you put him on the scales. But if you take away his phosphorus you probably won't see anything wrong at all unless you have an eagle-sharp eye and know hogs from stem to stern. There is no easy way for a farmer to tell how much minerals his stock needs. Lack of enough comes out in very small, intangible signs—failure to settle properly, slowness to gain, small litters, susceptibility to disease. However, the American farmer can be sure of one thing—his stock needs added minerals. All authorities agree on that and they all agree on the approximate amount. Hogs, for instance, everywhere need from one to two per cent minerals in their ration. You can safely feed up to four per cent, but may not need that much. Excess amounts won't harm your stock but it is expensive. Salt is essential—two pounds a month per head for cattle when on good grass. Hogs need more.

The value of a mineral is in direct proportion to its need. Needs vary widely according to the type of ration used, the age of the animal being fed, the job or task of the animal under consideration, and the natural mineral resources in the soil and feeds of a specified locality. No intelligent livestock feeder will use minerals of the same amount in all feeds for all kinds of livestock.

In swine feeding, mineral feeds are needed in greater amount than for the ruminants, which secure much of their nutrition from grasses and forages. Young animals need more minerals than mature ones. Cows in heavy milk production, nursing sows, ewes or mares, and the sire in heavy service need more minerals than mature animals in a latent state of productive activity. To complicate the problem still further some animals need minerals in varying proportions in a mixture. For instance, beef breeding animals depending largely upon legume roughage for sustenance, get an adequate amount of calcium, but not enough phosphorus.

Basically, a mineral mixture should contain calcium, phosphorus, salt, and iron. In addition to these basic minerals in a mixture, others, sometimes called trace minerals, are needed under certain conditions in livestock production and with certain environmental conditions. Those most often found lacking are: iodine, manganese, and cobalt.

Now, why are these various minerals needed? Minerals constitute an important part in the nutritional needs of humans and animals. It is important to stress the phrase "nutritional needs" because that is exactly the function of mineral feeds. To advocate minerals as medicinal agents constitutes mis-representation except as they may be useful in preventing or correcting nutritional ailments, or in building up resistance to ward off diseases. It would be equally legitimate to advocate protein supplements as medicinal in nature, as it is to do so with mineral feeds. Minerals won't cure sick animals as medicines do. They are essentially foods.

Hogs Need More Minerals

Hogs need more minerals than any other stock. This is true because of the general architecture and design of a hog and the types of feeds he eats. Minerals for swine feeding have considerably more value when plant protein supplements are used exclusively in the ration. The following table taken from Smith's Pork Production represents results from an average of 22 swine feeding experiments.

Minerals vs. No Minerals with Plant Supplements on Forage.

Rations	Av. initial wt. of pigs lb.	Av. daily gain lb.	Av. feed required to produce 100 lbs. of gain
Grain + plant supplement + forage	60	1.216	Grain 400 Sup. 37
Grain + plant supplement + minerals + forage	60	1.382	Grain 350 Sup. 31 Min. 2.78

In these experiments the pigs were on forage. Under such conditions the mineral needs are considerably less than when pigs are fed in dry lot. Despite this fact, the total feed requirements for the "no-mineral" pigs was 437 lbs. for each 100 lbs. gain. while for the mineral fed pigs, the requirements were 383.79 lbs. of feed for each 100 lbs. gain. The difference in feed response was 53.21 lbs. for each 100 lbs. of gain in favor of the mineral fed pigs. At the present price of feed the minerals would yield a savings of approximately $2.65 for each 100 lbs. of pork produced.

The conditions under which minerals are most valuable in swine feeding are as follows:

1. When the pigs are under 100 lbs. in weight.
2. When hogs of any age are fed in dry lot and do not have access to good quality forage.
3. When hogs are running on poor quality forage.
4. When the protein supplement is made up entirely of plant materials or dominated by them.
5. When the forage is non-leguminous in nature, such as timothy or bluegrass.

Mineral Mixtures and Reasons For

A quick inspection of a recommended supplement for brood sows in gestation will partially answer the question of what minerals to use. The following supplement is one suggested by J. L. Krider of the University of Illinois:

Ingredient	*Amount (lbs.)*
Dehydrated Alfalfa meal (17% protein)	800
Soybean Oil meal	500
Tankage (60%)	400
Fish meal (58—60%)	150
Ground shell or limestone	60
Steamed bone meal	50
Manganese Sulphate	½
Vitamin A & D oil (2000 A, 400 D)	12
Iodized salt	30

The Line-Up of Minerals

This supplement includes calcium, phosphorus, manganese, chlorine, sodium, and iodine and for very good reasons. The sodium and chlorine are combined to make salt, a most important compound in any ration for animals. Salt serves as a conditioner and has an important function to fill in nutrition, and the excretion of wastes. Furthermore, salt induces greater water consumption which is most important in the assimilation of feed and good growth.

Calcium is a very important ingredient in a mineral feed. It insures proper bone and muscle development in the growing animal and sustains skeletal strength in the mature animal. Because swine depend so largely upon grains, calcium is especially important in their rations. In the suggested supplement such feeds as alfalfa meal, oyster shell, limestone, and steamed bone meal are especially rich in calcium.

Adequate phosphorus in the animal ration assures proper bone, muscle, blood and nerve development. Furthermore, an assured calcium—phosphorus balance in the ration is a guarantee against depraved appetites and possible breeding difficulties on the part of females. Animals lacking in these two minerals, are often hard to settle. Irregularity of the heat period may be caused by a phosphorus deficiency. Packing house by-products, steamed bone meal, and defluorinated phosphate are common sources of phosphorus.

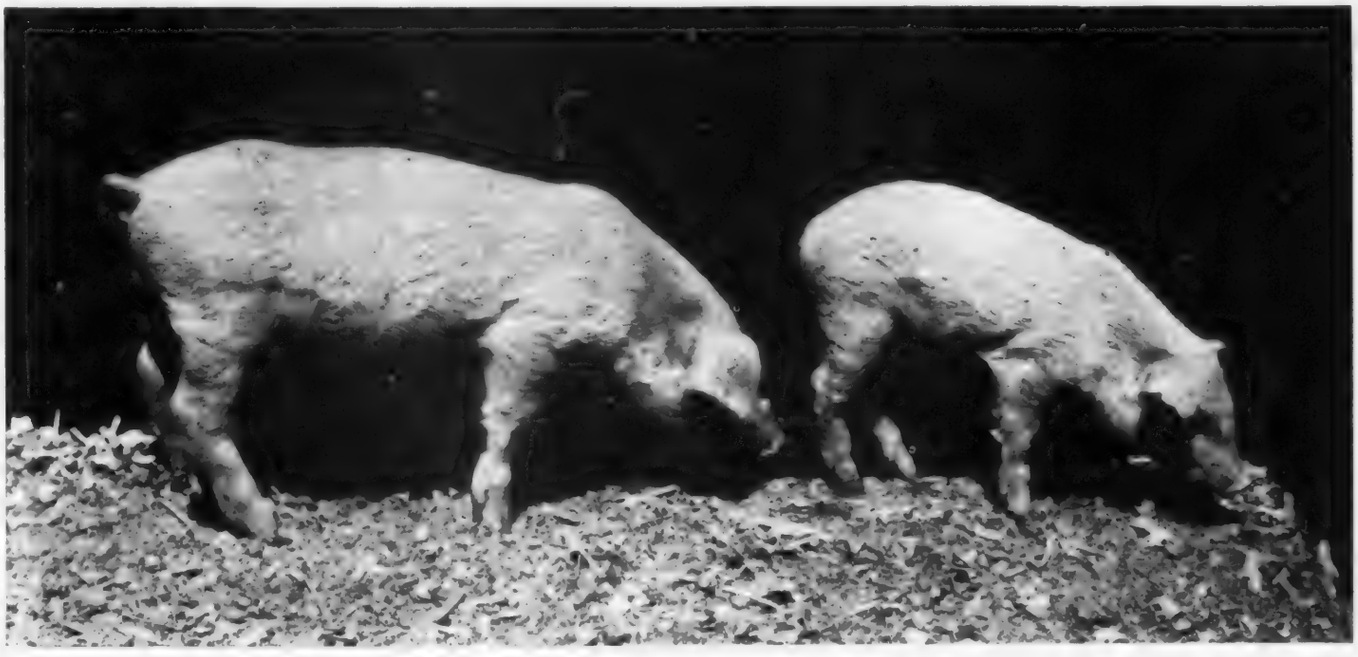
THIS HEN lacked the proper minerals and developed a pair of bandy legs from the lack.

Iodine is needed more in some communities than others. Goiter in calves, pigs, and lambs, together with hairlessness in pigs, are common symptons of an iodine deficient ration. The suggested supplement carries iodized salt which presumes to fulfill the iodine need. In cases of extreme iodine deficiency in certain communities it is doubtful if iodized salt would meet the needs. More must be added in another form.

In the case of manganese it is thought that this mineral has a beneficial effect upon the reproductive functions of animals, and that it is a preventative of perosis in poultry. At any rate nearly all mineral manufacturers are including a trace of it in their feeds.

(Continued on page 108)

HOGS IN DRY LOT are more likely to need supplemental minerals than those on range. Suckling pigs particularly may need iron. The pig on the right received no iron and weighed only one-third as much as his litter mate on the left.



SOUR, SOGGY FIELDS, usually the domain of crawfish and weeds, supports a good stand of Tall Fescue. Crawfish find water just beneath the sod.

TALL FESCUE

BY EVART VANDER MEULEN

Tall Fescue would have to be a miracle to live up to its press, but its tolerance for both wet and dry land and its long growing period make it a valuable pasture grass.

FESCUE has had eager press agents and a good press—so good that it has probably been over-rated and over-sold. The reaction of some people to this enthusiasm has been to say that it is the Tom Thumb of grasses ballyhooed into a Goliath. Nevertheless this grass has some rights to the slogan "Fecue to the Rescue," which its promoters have used; for it has rescued thousands of acres of land, much of it sub-marginal. It has been found to be suitable for wet heavy land where some other pasture crops were drowned out. Its deep, clinging root system has made it an excellent grass for erosion control on hilly country. Its growing period enables it to provide green pasture during the heat of the summer when many other grasses lie dormant and, in the South, through the winter when their pastures are brown or bare. In addition to its ability to grow on wet land its wide range of tolerance permits it to survive during dry periods. Its compact wear-resistant turf makes it very valuable for air-strip and playing field planting.

It is not, however, the beginning and ending of all grasses. There just isn't such a plant. Tests indicate that it is slightly lower in protein content than most other pasture grasses. During certain stages of its growth it seems to be less palatable than other grasses. Its hay production is found to be lower than that of other grasses for any given year, but its average over several years will probably be higher because of its continuous vigorous growth.

Where Did It Come From?

Common Tall Fescue was introduced from Europe nearly a century ago, but it had only a temporary popularity and became practically unknown until Oregon and Kentucky brought out the two strains—Alta and Kentucky 31. Botanically, Tall Fescue is closely related to Meadow Fescue, a standard grass of western

A ROCK WAS THE SEEDBED for this crown of Fescue which grew and matured on the thin layer of earth on the stone. Its matted roots help control erosion.

Europe, but it is taller, more hardy, and has a deeper root system.

The two strains of Tall Fescue, originating over 2,000 miles apart, one developed by man and the other by natural selection, are similar in general appearance and, so far as is known, have not shown material differences in growth habits and adaptation.

Alta and Kentucky 31

The Alta (meaning tall) strain of Tall Fescue originated as a plant selection from common Tall Fescue by Dr. H. A. Schoth, Senior Agronomist, U. S. Department of Agriculture at Corvallis, Oregon. Dr. Schoth began his work on this grass in 1918 and made a selection from a four-year old stand in 1923. The initial commercial seed harvest took place in 1936, and since that time has rapidly increased. In 1938, 22,000 pounds of Alta Fescue seed was produced; last year approximately two and a half million pounds were available for distribution.

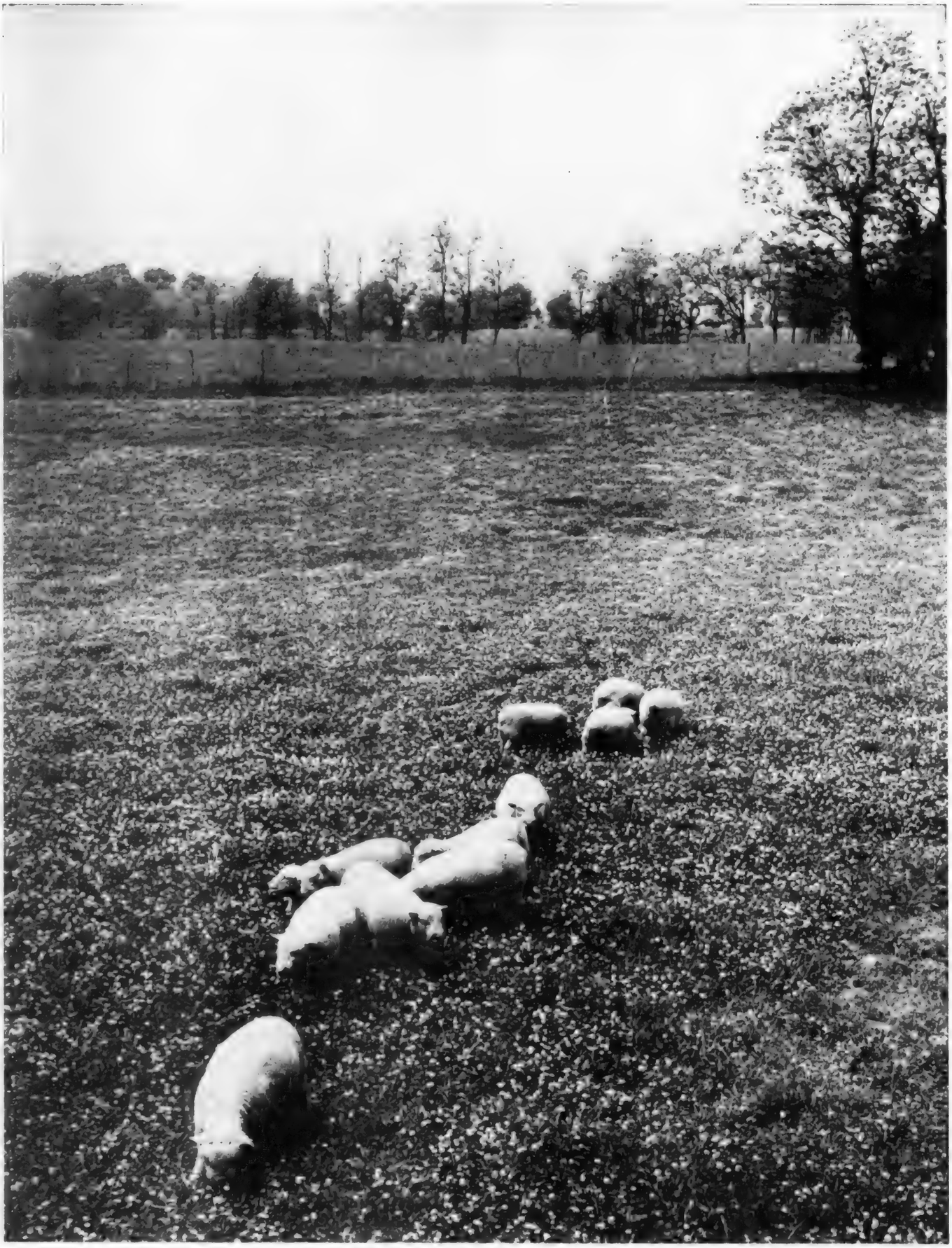
Nature herself developed and selected Kentucky 31. It was first found in small patches on the hill farm of William M. Suiter in Menifee County, Kentucky, where it apparently was growing at the time Suiter bought the farm in 1887. It is believed the original seed was brought to Kentucky from Virginia by the early settlers, one of whom was Suiter's father. Left to itself, the strongest plant survived and, by a natural process of selection and adaptation, the hardy strain of Kentucky 31 was evolved.

Suiter noticed that the small patch of the strange grass remained green the year around, even during the winter and droughty periods of summer. He carefully harvested a little seed each year until he had most of his mountain farm sown.

Forty-four years after it was first noticed by Suiter, it was brought to the attention of Dr. E. N. Fergus, agronomist in charge of pasture at the University of Kentucky. The discovery of a new continent could have been no more impressive to Dr. Fergus than his first visit to Suiter's farm in the late fall of 1931. There he saw a grassy field that seemed to be standing almost on end as it rose, at a 45-degree angle, from the roadside. It was green and lush while all other pastures were bare and brown at that time of year. More impressive was the absence of soil erosion on this steep hill whose neighbors were bare and gullied. Dr. Fergus' trained eye saw the possibilities of this grass for year-round pasture and for soil erosion control. Suiter gave him a small sample of seed which he planted at the Experiment Station in the spring of 1932. The figure 31 in the name of this variety, incidentally, represents the year the University began working with the grass.

In 1946, Kentucky had 30 seed growers harvesting about 75,000 pounds; two years later over 950 growers harvested seed, producing nearly 4,000,000 pounds. At the present time it is grown in practically every county in the southeastern states and covers a million acres or more with a profitable pasture grass, much of it on land which, heretofore, was producing little if any livestock forage.

The farmers who raise Kentucky 31 seed have organized themselves into the Kentucky 31 Fescue Association with offices at 929 South Limestone Street, Lexington, Kentucky. The secretary of the Association, Eugene Culton, Jr., a dynamic fellow in his late thirties who was formerly a county agent, talks about Fescue with about the same fervor that a new convert speaks of his religion. "Boys," he says, "when you work



TALL FESCUE AND LADINO CLOVER made a good pasture mixture for these Southdown sheep. The Ladino adds palatability and, by trapping nitrogen, reduces the fertilizer requirements and increases the protein content of the mixture.

ON THIS KENTUCKY HILLSIDE William Suiter planted his Fescue some fifty years ago. Grazing stock tramped out the terraces. On this farm is perhaps the only monument ever erected to a grass.

with Fescue for a while you get the reputation of being the damndest liar in the world. Now I don't go around telling how I saw a clump of Fescue latch onto a boulder and crush it into fine top soil, like some of them do, but I have seen cows break through a stout fence and leave a pretty fair pasture and get into a field of Fescue. And I've seen it stop gullying on a hill that was so steep you could almost see it wash away, before they planted it to Fescue."

What Is It?

The two strains, Alta and Kentucky 31, are apparently identical; we'll lump them together as Tall Fescue in the following. Tall Fescue, known botanically as Festuca elatior var. arundinacea, is a deep-rooted, semi-bunch, long-lived perennial grass. It has numerous dark green, smooth, shiny leaves which arise mostly from the crown of the plant, rather than from the stem. Unlike some bunch grasses, such as Orchard grass, the plants increase in size and eventually make a close tight sod. However, when 20 or 30 pounds per acre are sowed, two or three times as heavy as the normal rate, a dense sod is formed the first year.

The roots of Tall Fescue are numerous and coarse, penetrating to a depth of four to five feet, which gives it a high degree of drought resistance and a tight grip on the soil. It is definitely a soil binder for erosion control. Once it gets a toehold on a hillside, runoff, or gully, the soil stays with it and the water runoff goes into slow motion.

Tall Fescue is a soil improver, especially for heavy land, because the roots open up the soil below plow depth, and a large amount of organic matter accumulates as a result of a partial renewal of the root system each year.

Even though this grass is tenacious, when once established, it is not difficult to eradicate. Shallow plowing of the sod in midsummer three to four inches deep, laying the sod over as completely as possible, followed with thorough discing at sufficient depth to chop up the turned sod, with a replowing six to seven inches after all grass is dead, has proven to be the best method of eradication.

Tall Fescue seed stalks attain a height of four to five feet with a branched or panicle type head. The seed is about the size and shape of Rye grass, but somewhat darker in general appearance, due to the purplish tinge of the chaff and the dark purple color of the kernel.

This tall grass has a long growing season, staying green the year around in areas with mild winters. In the Pacific Coast states, where the Alta strain is grown exclusively, the grass remains green throughout the summer and almost continuously through the winter. In western Oregon, growth is continuous during the four seasons. Farmers in Kentucky have reported that they pasture their fields the year around except for occasional periods of extremely cold weather, or when the fields are blanketed with snow. Fescue has an important place in pasture mixtures now found best for winter grazing.

In the north-central and northeastern states, Tall Fescue is one of the last to fold up for the winter, and one of the first to start growth in spring. It has a wide climatic adaptation, growing successfully for pasture from Canada to Florida and from coast to coast on land where there is at least 20 inches of rain. For seed production, the crop needs a minimum of 30 inches of rain.

Soil Preference

Tall Fescue is not too particular about

the fertility or type of soil, but like all plants, prefers fertility to want. It does best in fertile, moist, rather heavy soils, but will make a good stand on anything but extremely light soils. It prefers a neutral soil, but will grow on either moderately acid or moderately alkaline soil.

When limed, and fertilized, low-grade soils produce good crops. It should be given a ration of nitrogen at seeding time and then at reasonable intervals. Like other grasses, Fescue is a comparatively heavy feeder of nitrogen, which can be supplied either in the form of commercial fertilizer or by a legume planted with it. Ladino clover, Lespedeza, and others are suitable.

Like Lespedeza, the universal legume of the south, it will grow almost anywhere, but the better the soil the better the forage in both quantity and quality. It is, however, its ability to reclaim land that is too wet or too dry for ordinary crops that causes most of the excitement about this grass.

Tall Fescue, like Orchard grass, grows well in the shade. This permits seeding on cut-over land and farm woodlots.

It is extremely tolerent to poorly drained, cold, wet soils, and will survive in standing water for long periods, especially during the winter when the plant is semi-dormant. Thousands of acres are growing successfully on cold, wet "crawfish" land where the water table is above the surface for short periods during the rainy season, and is so close to the surface during the remainder of the year that crawfish find it easy to burrow to the water and live on this land as comfortably as they do on the creek bank. Crawfish land, long regarded as a useless producer of marsh grass and weeds, has been given a new value by Tall Fescue.

Culton, the Kentucky seed grower, is using some of this wet land for seed cultivation. He said of one plot, "The old boy that had these thirty acres before I started farming them told me that the land was so poor he wasn't getting but a gallon of corn to the shock. You ought to see it now! Last year, under heavy fertilization, we got 254 pounds of seed to the acre, and this year we ought to do even better." It will make good pasture on high, stony, droughty soils and its massive, deep-root system will help hold the hills in place.

Tests at Purdue University in 1947, a year extremely dry during July, August and September, showed Tall Fescue making a greater recovery of forage after frequent half-inch clipping than other common grasses.

Seeding

Tall Fescue should be planted in a firm, clean seed bed. While it can be sown on unprepared ground or established sod with fair success, it grows faster and more abundantly on a well-prepared bed. It can be sown either in late summer or early spring. Seeded in late summer, it produces a cover crop for the winter, holding erodible soils, and furnishing some winter pasture. Late summer seeding also permits harvesting a seed crop the following year. It compares favorably with Rye grass in this respect.

On the Pacific Coast, late summer planting is usually practiced except on cultivated hill soils that heave badly during the winter or early spring. In Kentucky, summer seeding is done between August 15 and October 15, and spring seeding in March or early April.

Tall Fescue can be sown with small grain, but is better sown with other grasses and legumes, and it can be seeded in standing corn at the last cultivation. Many farmers feel that legumes are a *must* in any Fescue mixture.

Seeding should be shallow, not more than one-half inch. Some farmers prefer seeding on top of the ground. The next rain will cover it sufficiently for good germination. Sow 10 to 12 pounds per acre for solid drill seed production, 14 to 18 pounds per acre for forage. When planting with grasses or legumes, the rate may vary from two to sixteen pounds. Ten pounds of Fescue with one or two pounds of Ladino clover makes an excellent pasture mixture. Livestock like the mixture, and the legumes cut down on fertilizer requirements.

Seeding can be done with the ordinary drill through the grain attachment. With the Superior drill set on "1" for oats, ten pounds per acre is applied. Drilling is preferred to broadcasting since more uniform stands are obtained. However, broadcasting the seed followed by light harrowing is satisfactory. Good stands result when about fifteen pounds of seed are mixed with one to two hundred pounds of dry, well-cured phosphate and sowed through the fertilizer attachment.

Precautions should be taken to prevent seeding too deep and to have a firm seed bed. Poor stands are generally the result of deep planting. Severe crusting of the

TALL FESCUE AND RYEGRASS (right) are easily confused when growing together. Their seed is almost identical in size and shape. This makes mechanical separation almost impossible. Fescue seed is darker and is distinctly veined on the back.

ROW CROP PRODUCTION FOR SEED on the Pacific Coast has increased the yield, produced cleaner seed and maintained profitable seed production longer than when grown in solid stands. This is Alta Fescue, almost identical to Kentucky 31.

soil will also cut down stands.

Tall Fescue in both seed and forage production responds well to liberal applications of nitrogen, either in the form of commercial fertilizer or as nitrogen supplied by companion legume crops. An application of 200 to 300 pounds of complete fertilizer at seeding time, such as 4-12-4 or 8-8-8, will more than pay for itself. When sown with a legume, apply the necessary fertilizer suitable for good production of the legume. A straight seeding of Fescue generally responds well to later applications of nitrogen, 100 to 150 pounds of ammonium nitrate, or equivalent, per acre. Nitrogen starvation causes a sod-bound crop that is thin and lacks vigor. The nitrogen fertilizer should be applied in early spring before rapid growth has started.

Tall Fescue pastures are long lived and do not require frequent reseeding. There are fields growing in Kentucky today, said to have been planted over 50 years ago, that have never been reseeded.

Fescue for Forage

Information regarding protein content, digestible nutrients and palatability of Tall Fescue is, as yet, rather meager and difficult to assess, since all grasses will vary according to the soil on which they are grown. Tests on protein content of Fescue, for instance, have shown a variation of from 9.4 to 25.1 per cent. Comparative tests at Purdue University, however, show that Fescue has about the same protein content as Kentucky Bluegrass and Orchard grass, and rates somewhat lower than Bromegrass and Timothy. Some reliable reports on the feeding value of Fescue show that during July and August its feed value fell, even failing to equal that of Orchard grass. This, it is pointed out, was in July and August when the palatability of Fescue was at its lowest.

Preliminary tests at the Kentucky Experiment Station on total digestible nutrients per 100 pounds of dry matter indicate that pasture Fescue produces about 56 to 77 pounds, depending on the stage of maturity of the grass. The young growth contains a larger amount of total digestible nutrients than more mature growth. Digestion experiments on Fescue hay have not yet been conducted at the Experiment Station, but it is likely that good quality hay would contain about 50 pounds of total digestible nutrients. These figures show Fescue to be similar to Orchard grass in total digestible nutrients.

The foliage of Fescue has a tendency to become somewhat coarse, tough, and unpalatable as it reaches maturity, which brings us to the point of proper pasture management.

First, for hay or pasture, it is advisable to grow this grass with a legume, which indirectly increases the protein content of the grass by the addition of nitrogren to the soil. As a mixture the combination forage is more palatable and nutritive than straight Fescue.

Fescue is almost never planted alone for either hay or pasture since its value to the farmer is materially increased as a feed, in palatability, and in carrying capacity, when mixed with a legume. One recommended pasture mixture is:

Seed	Pounds per acre
Tall Fescue	4
Orchard grass	4
Timothy	4
Ladino clover	3

Farmers will naturally study their local conditions and consult their county agents to find the best mixture for their particular needs and conditions.

In Kentucky and adjoining states, mixtures of Tall Fescue with Ladino clover, Lespedeza, White Dutch or Alfalfa have proved very successful as hay or forage. Other legumes, such as Birdsfoot Trefoil, Subterranean clover and Alsike are used quite extensively, especially in the Pacific Coast states.

Secondly, since Fescue has a tendency to become coarse and unpalatable as it ages, continuous new growth should be encouraged by pasturing closely. If there are not enough livestock to keep it down, it should be clipped to keep the young succulent growth continuing during the growing season. Keeping the grass mowed down or grazed closely will reduce injury from stem canker and leaf spot which are two diseases that are known to attack

(Continued on page 112)

What Is A Chicken Hawk?

BY CHARLES P. FOX

The night hawk is not a hawk, the sparrow hawk doesn't live on sparrows, and most chicken hawks don't catch chickens.

ONE winter day I was watching a hen pheasant eating at a feed hopper behind my house in Wisconsin. Like a bolt out of the blue a Cooper's Hawk hit her in the back. The pheasant was killed instantly. I ran out and robbed the hawk of its meal. When I dressed the pheasant I found her back crushed as though someone had struck her with an iron bar.

Hawks live by killing. They know only to take their food where they find it. Since the food that all hawks like is either on the foot or on the wing, and very much alive, it means that hawks by nature must be killers. The food of many hawks is insects and rodents that are in turn enemies of the farmer. To most farmers all hawks are chicken hawks and best observed through the sights of a 12 gauge shotgun. The foraging of beneficial hawks is less spectacular and seldom seen, but those which raid the poultry yard give all, both good and bad, an evil reputation.

Few of us can tell one hawk from another, so we shoot everything that remotely resembles a hawk, and feel very righteous about it. This constant hunt may even include such birds as the night hawk, which is really not a hawk, but a cousin of the Whip-poor-will.

If a pair of Cooper's hawks live in the woods a half mile from the chicken yard and make daily raids on the poultry the farmer is filled with righteous anger. The Cooper's hawk likes young, tender fowl. On a killing spree, it can cause a farmer many anxious days. Eventually the farmer is waiting just inside the barn door with his shotgun at the ready. The hawk swoops around the edge of the woods and comes in for a landing on the back of a spring fryer. At the same moment the farmer steps outside the barn and stops the killer with a pattern of buckshot. The hawk is nailed to the side of the barn and the kids get the idea that only dead hawks are good hawks.

If a big, Red-shouldered hawk flies in over the barnyard he too is shot. The farmer is satisfied that he has stopped a much worse hawk than the one that

raided his hen yard because it's larger. Actually the Red-shouldered hawk was probably looking for meadow mice and wandered off his beat. He would have paid no attention to chickens, for his diet is 95 per cent insects, mice, gophers and frogs. The problem is to tell one hawk from another, the good from the bad.

No two kinds of hawks have the same eating habits. In the Midwest there are nearly a dozen species and each has his own ideas about what constitutes a good lunch.

Hawks that eat mostly mice earn their keep on any farm. One way a farmer can save himself some money every year is by learning to identify the mouse eaters and encourage them to stay on his farm. The U. S. Department of Agriculture says that it takes 23 pounds of green food to support one meadow mouse for a year. It is estimated that no farm land has less than 10 mice per acre, which means that on every 10 acres of meadow, mice eat a ton of hay a year.

Wildlife statistics show that in regions where hawks are growing scarce this figure of 10 mice per acre is increasing.

Some sportsman's clubs still stage vermin hunts in which they encourage members and neighborhood boys to collect all the pests they can find. Among the rats and crows turned in are usually a few hawks that if allowed to live would have continued the vermin hunt long after the closing date.

Your Free Boarders

Nurserymen and fruit growers should be the hawk's best friends. Their losses from the girdling of young trees by rabbits and mice in the winter would climb if it were not for the methodical patrols of the mouse hawks, or Buteos.

Those who make a business of studying the habits of birds have two methods of finding out what a hawk eats. Sometimes they build a bird blind in a tree near a hawk nest and study through binoculars the types of food the old birds carry to their young. The more accurate method, however, is to look into their stomachs.

Stomach analysis is an infallible method of telling which hawks are on the farmer's side and which are not. The Bureau of Biological Survey of the Department of Agriculture studied 5,185 stomachs of different species of hawks. After identifying what the birds had eaten, the experts listed the hawks in their relation to the farmer.

Enemies of the farmer

Goshawk, Sharp-skinned hawk, Cooper's hawk.

Indifferent (Bad and good habits about equal)

Marsh hawk.

Slightly on the good side

Red-tailed hawk.

Almost entirely beneficial

Red-shouldered hawk, Broad-winged hawk.

American Roughleg, Sparrow hawk.

Such a list, however, is of little practical value to the average person, since most of us can't tell one hawk from another. If we are to protect the good hawks and kill the bad ones we must first be able to tell the difference between them. This is no easy task, for in their quick flight they look very much alike. The Pennsylvania Game Commission learned this a few years ago when it requested the public to send in Goshawks for study. They received 2,817 birds—but only 45 per cent were Goshawks. People who have learned to identify hawks divide most of them into two types:

1. "Accipiters or "bird hawks," which include the Goshawk, Cooper's hawk and Sharp-shinned hawk.
2. "Buteos" or "mouse hawks," including the Red-tailed, Broad-winged, Rough-legged and Red-shouldered hawk.

The largest of the Accipiter group is the Goshawk; next the Cooper's hawk, and the smallest is the Sharp-shinned hawk. These are long, slender in body, and have long, narrow tails and short, blunt wings. They fly at tremendous speeds. Their audacity is beyond compare. They have been known to snatch a chicken or turkey poult from under the nose of a frustrated, fist-waving farmer.

The Cooper's, Sharp-shinned and Goshawks are the real chicken hawks. These streamlined killers subsist primarily on birds and poultry. In flight they flap and glide, flap and glide. Suddenly they spot their dinner and dive directly, even through thickets and brush on the helpless bird or animal.

Sharp-shinned hawk:

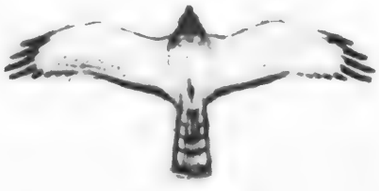
This small killer is sometimes called "feathered lightning." He is likely to be confused only with the Cooper's and the Sparrow hawk. The Cooper's is larger than the Sharp-shinned. The Spar-

THE COOPER'S HAWK is a connoisseur of fine chicken. Once started on a killing spree he may bedevil the farmer until stopped with buckshot. This killer is responsible for much of the blame centered on the good hawks. No state protects him by law.

Sparrow Hawk

Sharp-shinned Hawk

Cooper's Hawk



Marsh Hawk

Red-shouldered Hawk

Red-tailed Hawk

row hawk is nearly the same size as the Sharp-shinned but his wings are long and graceful, while those of the Sharp-shinned are short and blunt. The Sharp-shinned hawk also lacks the reddish brown coloring on the back which is a Sparrow hawk's trade mark.

Cooper's hawk:

The Cooper's hawk is a big brother to the Sharp-shinned. His added size enables him to take larger poultry and game birds. In most cases where a farmer is losing chickens he is losing them to a Cooper's hawk. If any bird is a "chicken hawk" this fellow gets the dubious honor. His size is about that of a crow. He has rounded wings, and long, narrow tail. He flies at high altitudes until he sights his prey, then darts on the victim, sinking his talons in its back.

The Rodent Patrol

In the second group are the Buteos often called the mouse hawks. They have broad wings, heavier bodies, shorter tails than the Accipiters, and are slower in flight. They police the landscape by gliding and soaring in lazy circles over fields and marshes. This habit makes them easy targets and many die for the crimes of the Accipiters. Unless one is sharp-eyed, the two groups are difficult to identify. The drawings on this page illustrate the differences between them.

The Buteos have little fear of man and often hunt the fields and woods right up to the barnyard. They usually perch in the open, often on the top of a dead tree, a perch that gives them a command of the surrounding countryside. The farmer has few better friends in the bird world than the Buteos.

Red-tailed hawk:

The tag that identifies this rather large hawk is his red tail which shows in flight as he wheels in the sunlight. As he flies his tail is spread fanwise. He flies in ever-widening circles climbing constantly higher. When in search of food he perches on a dead limb in a high tree and watches until he locates his prey then dives on it.

Red-shouldered hawk:

The adult Red-shouldered hawk has reddish brown underparts and a dark colored tail barred with white. When the bird is on the wing his red shoulder patches are visible only from above. He eats mostly mice and insects which he gathers from the wet lowlands and marshy areas which he inhabits. He is seldom found in rocky regions or in the high hills.

Broad-winged hawk:

Looking up at the underside of this bird while he is in flight one can identify him by his almost pure white wings

Rough-legged Hawk

Broad-winged Hawk

Goshawk

Turkey Vulture

WITH these drawings, and a bit of luck, you can tell the good hawks from the bad. These pictures show hawks from below. The Turkey Vulture, or buzzard, is a carrion eater, and is protected in most states.

tipped with black, and by the white tail bands on a dark background. As hawks go, this is the gentle one. He eats primarily those insects, snakes and rodents that farmers like to get rid of.

Rough-legged hawk:

This is a hawk that the farmer could afford to have more of. The Rough-legged hawk eats mostly mice. He flies back and forth close to the ground over meadows and brushlands in search of food. He is about the size of the Marsh hawk and could be confused with him if it weren't for his sluggish labored flying which contrasts sharply with the graceful flight of the Marsh hawk. He gets his name from the fact that the front of his legs are entirely feathered.

Marsh hawk:

The Marsh hawk is a bird of the marshes and meadows. He flies tirelessly at low altitudes back and forth across his hunting grounds. His diet includes items that are both good and bad from the farmer's viewpoint, but careful studies of his food habits recommend that he be spared. The vermin he destroys far outweigh the occasional quail or rabbit he eats. Marsh hawks nest on the ground in the pastures and meadows. They are easy to recognize in flight by the pure white v-shaped patch of feathers at the base of the tail. When on occasion, he flies high overhead he may be known by the long squarish tail and long narrow wings.

Sparrow hawk:

The most common and one of the most beneficial, hawks on American farms is the tiny Sparrow hawk, little larger than a robin. He is a bird of beautiful colors and often shows them off as he perches on a telephone pole or hovers in one spot over a pasture field. He could be more accurately named the grasshopper hawk, for two-thirds of his diet is grasshoppers. He has speed and can maneuver like a jet fighter. His wings are long and pointed and his tail is long and narrow.

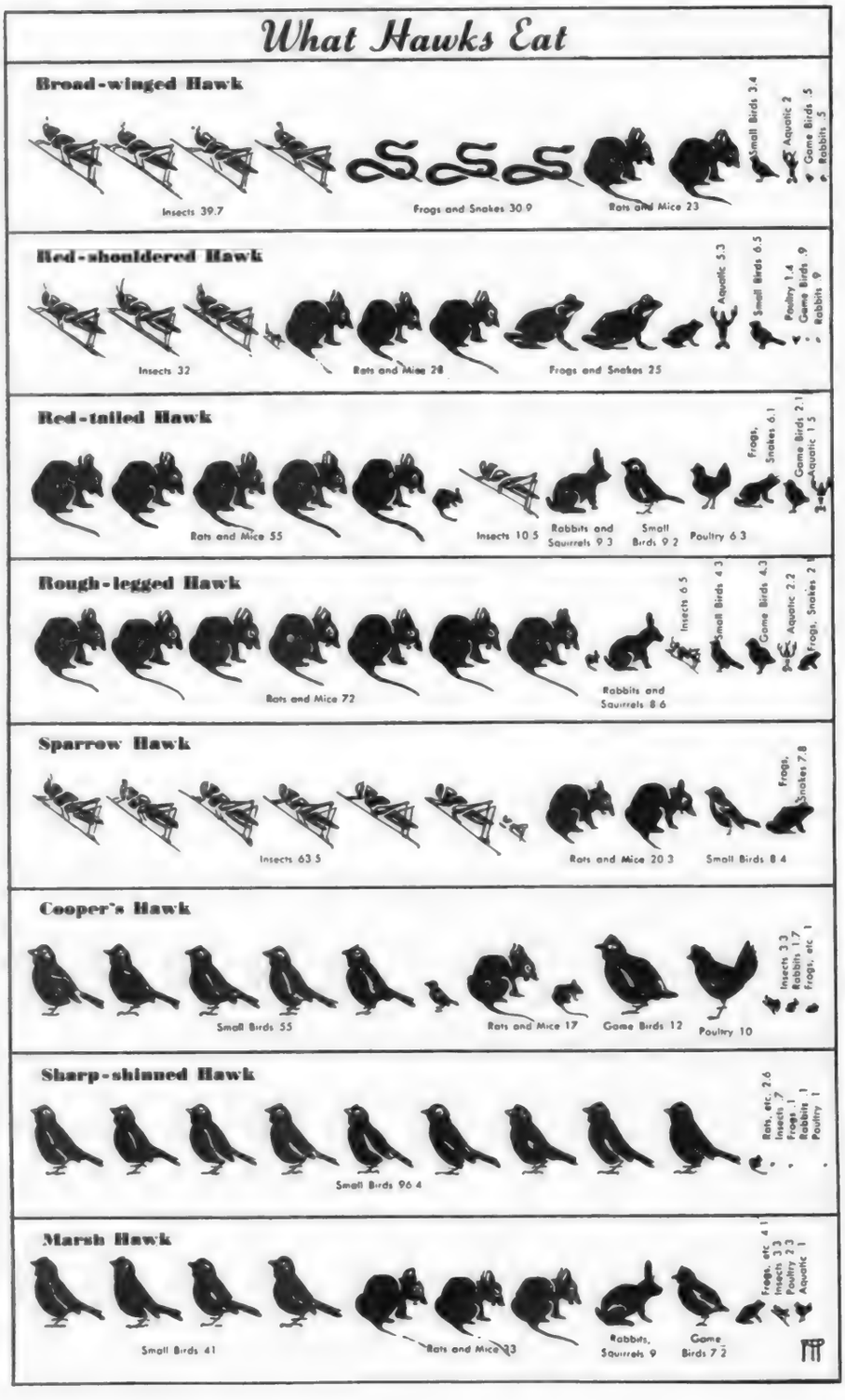
Almost without exception the farmer will find an Accipiter, either a Goshawk, a Sharp-shinned hawk, or Cooper's hawk responsible for any and all casualties to his poultry flock. They should be exterminated if they give trouble. All others should be preserved, protected and cherished as friends. In some states all but the Accipiters are protected by law; they are on the blacklist everywhere.

How To Protect Poultry

The positive method of dealing with gangster hawks is the shotgun. This is easier advised than carried out, for a hawk has a better pair of eyes than any farmer and can be as wary and wise as a crow. The farmer who finds a hawk raiding his poultry should study the hawk's habits. Watch from which direction it arrives and which way it departs; observe the time of day it makes its calls. Once the hawk's schedule and route is discovered, a farmer can antici-

THE SPARROW HAWK, little larger than a robin, works hard for his keep. He'll eat grasshoppers for every meal with a side dish of rats and mice. Though this ally of the farmer is protected by law, he is still occasionally shot because he is a hawk.

THE BROAD-WINGED HAWK lives in a penthouse, high above the fields and woods over which he hunts. He feeds his young on snakes, rodents and insects and is especially fond of the larvae of large moths. His diet rates him few black marks.



The U. S. Department of Agriculture Bureau of Biological Survey, studied the stomach contents of 5,185 hawks to learn what each species kills. This chart shows what they found.

pate the robber and be ready with the shotgun. Ted Igo of Clermont County, Ohio, followed this plan when a Cooper's hawk started making inroads on his spring chickens. He studied the hawk's time of arrival and departure. When he felt that he understood the bird he hid in a sycamore tree just before the hawk was due in for lunch. Igo got his hawk the first day. When there is no tree or other natural cover close to the chicken yard a corn shock makes a ready blind for a close range shot.

To be on hand at all times to protect the flock from a particularly active hawk is impossible. Therefore, the pole trap comes in handy as a last resort for catching the desperado. The pole trap is what its name implies—a pole with a trap set on the top. The chain on the trap is, of course, fastened to the pole. The idea is that the hawk likes to perch high to look over the situation. The high pole in the poultry yard looks inviting. However, it should be remembered that while a pole trap is meant for a chicken killer, the trap doesn't know that and will snap anything that releases it. Bluebirds and robins as well as beneficial hawks will be caught.

Some states outaw the pole trap. If you feel a trap is necessary, take it down as soon as the villain is trapped.

A wire roof over the yard is out of the question where poultry is ranging in pastures.

Some farmers swear by guineas which sound the alarm when a hawk flies near. This the guineas will do if they see a hawk, but unfortunately they shriek just as loudly at a piece of wind-blown paper.

They're Characters

Hawks have a lot of interesting habits. I recall the day I found a Cooper's hawk inside my pigeon coop. Apparently the hawk "swooped" on a pigeon sitting on the ledge of the barn. The pigeon managed to dart through the hole into the coop. The hawk, bent on squab for lunch, went in after the pigeon with utter disregard of its own safety. The hawk lost its head when it found itself suddenly confined in a small coop and dashed against the wire covered windows in an effort to get out. After it was removed it took hours for the pigeons to settle down. Many nests of eggs were chilled.

Hunters have pointed out that hawks kill game birds and animals and are therefore deserving of the same fate.

Some of the earlier beliefs about the damage done to wildlife by hawks have been disproved. The Rough-legged hawk was once considered a villain who dined at random on waterfowl. Since then careful investigations have proved that he eats mostly mice. Especially will the Cooper's and Sharp-shinned take quail and pheasants when they get the chance.

Herbert Stoddard of Thomasville, Georgia, the foremost expert on quail in the U. S., says he has found that Marsh hawks tend to concentrate in the winter in areas where the cotton rat is abundant. This is to the great benefit of the quail, as the cotton rat is a destroyer of quail eggs.

Smart Fellow or Dolt

Hawks can be at times uncannily smart; at others they can be the most stupid creatures of the wild. A few years ago the Milwaukee Public Museum sent a group of men into northern Wisconsin to photograph the nesting activities of a pair of Goshawks. With the aid of climbing irons, O. J. Gromme, head of the expedition, was climbing a tree near the one that held the nest. The female Goshawk struck Gromme with terrific force, cutting a slice out of his scalp with her talons. After that attack one of the men, when climbing up to the blind, wore a football helmet. The others wrap-

ped burlap around their heads. The hawk had the leather helmet slashed up in a week's time, striking it again and again with open talons. Never once, however, did the bird do this to the men with burlap headgear. Instead the hawk hit them whacking thumps with her talons closed like a fist. She knew she would have become ensnared in the burlap if she hit it with open talons.

On the stupid side, nothing can compare with the Goshawk who plummeted down on some pheasants in a wire enclosed yard of a farmer in northern Illinois. When the bird hit the poultry netting that served as a roof he bounced back into the air in a cloud of feathers. Stunned and dazed, he shook himself, and slowly flew away, but he had learned nothing. He repeated the dive four times until he was finally finished off by a well-aimed blast of a 20 gauge.

Irving J. Perkins of Oconomowoc, Wisconsin, is a farmer who knows the value of hawks. His knowledge helps him keep rodents under control. Of a recent experience he says, "We were hauling oat shocks out of a field, and there was a pair of Red-tailed hawks diving on the mice as they scurried for cover when we lifted the shocks. The hawks worked all afternoon. I don't know how many mice they caught, but it was plenty."

Howard Clapp, another Wisconsin farmer, also has respect for hawks and the job they do. "I had located a Marsh hawks' nest in an alfalfa field," he says, "and with field glasses was watching the old birds catch gophers and mice. Once the male was flying rather high with a mouse in his talons. The female flew off the nest and followed about 10 feet below him. The male hawk dropped his prey and the female rolled over in flight and caught it in mid-air. She then righted herself and flew down to the nest with the meal for her young." On Clapp's farms, the men cutting hay always leave an island of grass around their nests.

At the end of the day when dusk creeps over the farm the hawks go to roost. From out of the woods on silent wings come the owls to take up where the hawks left off.

Both hawks and owls are part of nature's plan to keep wildlife in balance by eliminating the weaklings. When a hawk extends his police duties to cover the farmer's poultry flock he's treading on dangerous ground and should be killed. Most hawks, however, spend their lives in the seclusion of the woods and fields far from the farmer's poultry yard. They police the landscape for rats, mice, insects, and other farm pests and for this cooperation with the farmer they deserve his protection. ★ ★ ★

THE RED-SHOULDERED Hawk likes to vary his diet with an occasional snake.

THESE YOUNG Marsh Hawks resent the intrusion of the photographer on the privacy of their home which is a hastily gathered pile of grass in a meadow. At haying time they are vulnerable to the mowing machine. Some farmers leave them an island of cover.

Memory brings back the flavor of a New England farm, and the wonder and excitement of a childhood spent as Father's right-hand man.

Father's Right-hand Man

BY GLADYS BRYANT TAYLOR

MY FATHER and I had a job. The year was 1905, and I was five years old. The job, to me the most satisfactory in the world, was to light the street lamps each evening just before sundown for a section of our small town located in southeastern Massachusetts. Our route consisted of about three miles of winding country road, along which were spaced lamp posts holding four-sided glass lanterns, the front panel of which opened. You know, the kind you hunt for in antique shops, or occasionally see in a dooryard wired for an electric light. But back in 1905 each lantern held a small kerosene lamp which Father cared for as meticulously as any lighthouse keeper. Perched high upon the seat of an old express wagon, he trimmed the wick and filled each lamp with just enough oil to burn until daylight. Then on the next afternoon, we repeated the process.

What made the job so satisfying was the fact that I drove the horse. I had already been exposed to that fever for which there is no cure, the love of horses, and I had a bad case. I groomed and fussed around the old black horse most of the day, deriving from it a pleasure only another afflicted with this particular mania can understand. I knew each piece of harness and every buckle, and could manage most of them if someone lifted the harness onto the horse for me. So you see, because the lamps had to be tended each day, it meant that I could harness and drive my beloved horse every day, come gales, rain, snow, or fine weather. There never seemed to be any question of my going. I tagged along with Father most of the time, and he called me his "Right-hand Man."

Mother dressed me for the weather and I was comfortable and happy.

The March of the Seasons

Many vivid memories of those drives remain with me. April, and the chill evening breeze carrying the good smell of wet earth; the welcome fragrance of fresh green grass as our wagon wheels turned into a grassy wheel-rut leading to a lamp post. The ear-splitting din of the peepers as the road dipped down toward the swamp at the foot of our hill, then the sudden silence as the noise of our wagon startled them; and as we drew away, the first brave peep, followed by the swelling chorus. Summer, and the roadsides white with elderberry bloom whose fragrance lay heavy on the soft warm air, haunting, and almost intolerably sweet; the horse's hoofs padding softly in the deep warm sand of the road as we jogged along. Autumn, with gusty rains splattering against our rubber coats, and the dead leaves driving along ahead of chill winds. We had to start out quite early to make the rounds before dark.

Each season held new excitement and adventure, but best of all was winter. In winter our familiar countryside changed almost daily. One day the badly rutted roads would be iron hard, smoke would rise straight up from chimneys, and no one would be outside the farm houses. Then again ponds would appear in fields where no ponds had been before, and miraculously, the breeze which rippled them would be from the south. Likely as not the ponds would be mirrors of ice on

the next afternoon, with the neighboring youngsters trying out their skates. Then came snow, and stone walls and fences disappeared, leaving a sweeping expanse of glistening white, whose surface was artfully crimped and scalloped by a fanciful but sharp north wind. We had to use the express wagon even in the snow because it was high and brought us within easy reach of the lamps, so that the fat black horse had to exert himself, and throw his head down and pull.

One winter afternoon is as vivid in my memory as if it were yesterday. There had been a considerable amount of snow followed by rain, and then it had frozen. The result was a world of ice. Fields and roads alike were glassy smooth. Dark limbs of trees were sheathed in ice. I remember sitting high up on the wagon seat watching the horse's newly sharpened shoes prick into the glare ice of the road, and the wagon wheels slither along, scarcely turning. As we drove along, the afternoon sun flooded the fields with a pink and gold light which the ice reflected from unexpected places. Jewels blazed and blinked at us from corners of buildings and pasture fences. It was a dazzling afternoon.

Upon our return, Father unharnessed and rubbed down the steaming horse, while I bustled around, bedding him, and fetching his grain and hay. The cold had been very severe, so Father sent me scurrying ahead into the house, where Mother took my aching fingers into her two warm hands and rubbed them until the numbness went, and the blood came prickling back.

The Groaning Board

Oh the heavenly warmth of that lamplit kitchen! In the center of the room, under the hanging lamp, was the table, laden with food. Always in the middle of the table, and to me the best centerpiece ever contrived, was our dessert. Very often this was a huge layer cake, filled and frosted an inch deep with whipped cream from our Jersey cow. Mother could make hamburg steak and mashed potatoes and one or two vegetables from the cellar seem like a banquet. There would be sweet pickles, and dills, and home-made bread and butter, and then the cake. Lightening cake, she called it, because it went together lightening quick. It would have disappeared that quickly too if she had allowed it. One piece was our allowance. It was gone before you got a real good taste of it and it was futile to eye the plate after that. You would just be reminded that there was more meat and potatoes if you were still hungry. That usually settled it; at that point we were hungry only for more cake. Mother was a good cook and no effort was too great for her to make for her family. She always said, "Better to eat, than to pay a doctor's bill!" And so we ate, and how we did enjoy it!

Sometimes there would be stewed kidney beans with fat, brown baked potatoes, or split green peas and carrots cooked with a ham bone. There might be a New England boiled dinner, and afterward the inevitable red flannel hash which was way and above better than the boiled dinner itself. Saturday night always brought baked beans and brown bread. Mother's brown bread was not soggy, not dry, but a combination of moistness and crumblyness that drank up the butter, and melted in your mouth even faster than did the lightening cake.

Winter desserts consisted of great slabs of fluffy gingerbread, eaten warm with applesauce; Indian pudding with whey that floated around it; baked apples with heavy cream; and sometimes brown bread pudding, made from left-over brown bread, and served with sauce made with elderberry wine, sugar and eggs. There was a lavendar colored froth on top; the sauce itself was the color of purple grapes. Let the gods have ambrosia, I'll take mother's wine sauce.

On very rare and special occasions, per-

haps once and never more than twice each winter, we had molasses tops. This was a wonderful treat. Molasses tops were the main course, the dessert, in fact the whole meal. You just ate and ate until you either laid down your fork or burst. They were made of dough similar to doughnuts, with a bit more baking powder, and perhaps not quite so sweet. They were cut out like biscuits and fried in deep fat where they puffed up and became crispy and tender on the outside and quite hollow inside. These were heaped upon a huge platter. Meanwhile a saucepan of molasses was boiled to just the right consistency, so that when it was poured over the tops it wasn't runny, and it didn't candy, just in-between. Mother knew when it was just right. A dish of molasses tops with their candy-like coating would dispel the gloom of the darkest winter day.

Neighborly Neighbors

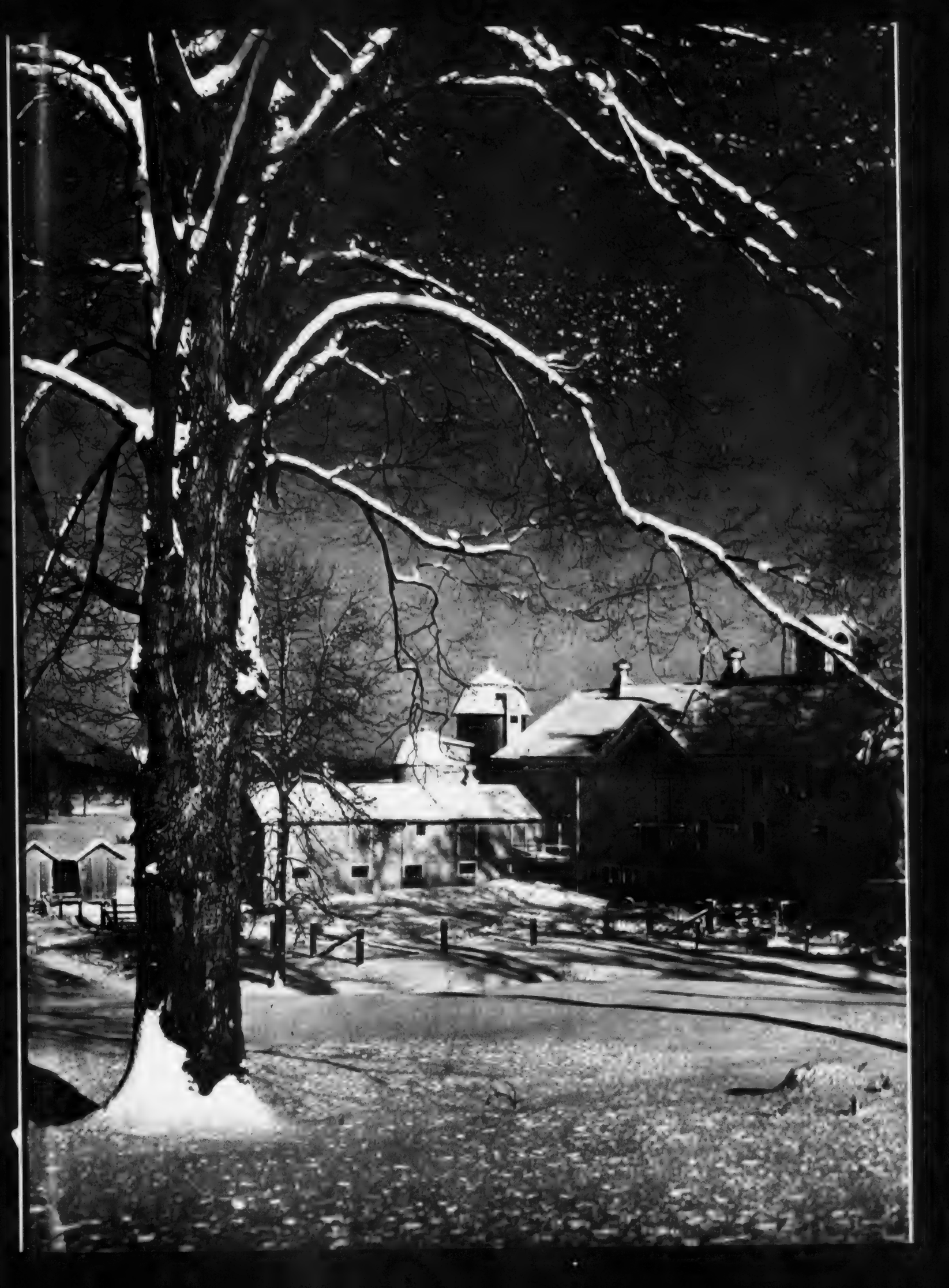
The next farm to ours was the Town Farm. The man who ran it was a short, round, lovable Dane with pink cheeks, and crisp, crinkly hair. He looked like a typical Norse sailor, and had, in fact, followed the sea most of his life. He and his missus had raised a large family of children who were all married and in homes of their own. So Cappy, as he was called, and Mrs. Cappy were alone again, and under their capable supervision the Town Farm prospered. Cappy, no doubt, was a good man in an emergency at sea, but one thing he didn't care to cope with was a frisky horse between the shafts of a cutter. So in winter, when the young horse which they kept became fractious from standing too long in the barn without exercise, Cappy came trudging cross-lots to our house to ask my father to exercise his horse for him. To Father this was a labor of love, or perhaps it would be nearer the truth to say that it was I who loved it, and to Father it was just a neighborly good deed. But I know that he enjoyed it too, for he was a good hand with horses. So the next day we heard sleigh bells, and the pretty, high-stepping horse came prancing up to our door, the shiny red cutter gleaming against the white snow. Mother and I, dressed in our warmest clothes, climbed in beside Father, tucked the fur robe around us, and away we flew. A feeling of pride welled up in me to be riding in such style! Our own horse was old, and never could it be said that he flew over the ground. Furthermore, we owned no shiny cutter nor fur robe. As we sped along over the snow and I sat watching the horse's high-held head, with mane tossing in the breeze, I thought of fairy stories of princes and princesses, and it seemed to me that I was a real princess.

If Winter Comes . . .

About the end of February or the first of March, when the seed catalogs began to arrive, we started our first chore in preparation for spring. This was setting the incubator. When the number of eggs, carefully saved in boxes and baskets and stored in a cool place, reached the right amount, we started out; Father carried the baskets of clean brown eggs covered with a cloth to keep them from becoming chilled; and I carried the lantern. Carefully we picked our way through the slushy snow to the brooder house. The incubator cellar was reached by a trap door in the brooder house floor. This door was rigged with a pulley and weight, so that a slight pull on a ring in the floor, and up it popped. The temperature down there was always mild, and the air which rushed up to meet us was moist and pleasantly odorous. To this snug underground room we journeyed twice a day to turn and cool the eggs, and tend the lamp which kept them warm. For nineteen days we performed our duties faithfully, pinch-hitting for about ten mother hens. On the twentieth day the eggs were not turned, because, as Father explained to me, on that day the chick itself maneuvers the egg into a position from which it can best extricate itself.

The tray on which the eggs were left at the last turning had an open strip, about two inches wide, near the incubator door. The door was fitted with a glass panel, and it was through this that I watched entranced as the miracle of birth

(Continued on page 141)



SNUG WINTER QUARTERS for the borer. He'll come out of these shocks in the spring and fall on the new crop like a plague.

CORN BORER

BY RICHARD E. STOCKWELL

IF corn had been a major European crop before World War I, government agents might have been keeping a sharper lookout at our ports and along our borders for an enemy alien, one Pyrausta nubilalis. For generations he had been committing larceny in the hemp, hops and millet fields of Europe. But since corn did not play too important a role in European agriculture, our border sleuths had no foreknowledge of what a real threat Pyrausta nubilalis—European corn borer to us farmers—would be to the United States, the leading corn producing nation of the world.

The corn borer, which is found all over Europe as far north as Moscow and southern Norway and Sweden, on the dry steppes of Asia and even in tropical Pacific islands as far south as Guam and the Philippines, didn't reveal its mania for destruction until it got into the home land of corn, the North American continent. As yet it hasn't reached the southern hemisphere, but farmers in Argentina, South Africa and Australia are preparing for an invasion.

The borer slipped into this country, presumably in a shipment of broom corn from Hungary, sometime before the summer of 1917.

It was discovered first near Boston, Massachusetts, that summer when several fields of sweet corn were found to be severely infested with light colored worms which tunneled into the stalks and later attacked the ears. In 1919 other infestations appeared near Albany and Buffalo, New York. During the next few years expert insect scouts found the Buffalo outbreak to be only a small part of an infested area, of some years standing, surrounding Lake Erie on all sides.

The Rampaging Borer

The borer had settled down in the United States to stay and there was noth-

ing to do but to make his life as hazardous as possible, learn to live with him, and try to prevent his spreading. In spite of all efforts he had traveled westward by 1940 into most states bordering the Great Lakes, southward to the Ohio River and along the Atlantic coast to the North Carolina line. Damage in 1940 was about $6,500,000.

By 1943 the borer had marched farther west and was half way through Iowa's tall corn. That year the nation's loss was $33,000,000. Last year he ate his way through $97,000,000 worth of corn, adding his villainy to that of a wet spring and a dry summer, causing an already short corn crop to be that much shorter. This was a direct loss of nearly 70 cents for every man, woman and child in the land, not to mention an additional, though indirect loss, in higher food costs occasioned by the shortage of corn to feed livestock.

This year borers chewed on corn from Maine to North Carolina, from the Canadian border to Tennessee and Missouri and as far west as the Dakotas, Kansas and Nebraska.

Illinois suffered most last year with a loss of $31,700,000. Iowa was close behind with $29,300,000, followed by Minnesota with $13,900,000.

Nowhere has the European corn borer spread faster than in Minnesota. That is not because of any lack of diligence on the part of its bug specialists, county agents or farmers. In fact, the borer lived up to entomologist's predictions when it multiplied and spread like a prairie fire in the Gopher state. Minnesota's climate, closely approximating that of central Europe, the borer's original home, plus large adjoining corn fields and a number of other host plants, are about as close to heaven as any borer could wish for on this earth. Minnesota's state entomologist, T. L. Aamodt, has kept an eye peeled for borers ever since 1938 because he knew that when the insect got into his territory it would multiply like a comptometer.

The first borer, a singularly lonely specimen, seemingly harmless and helpless, was found by Aamodt's watchers in 1943 in Houston County in the southeastern corner of Minnesota. The next year, in spite of all that exension service workers, farmers and others could do, it had spread to 18 counties in that part of the state. Thirty-two counties suffered from corn borer chewing in 1945; 40 in 1946; and 80 in 1947. The only counties to escape have been those few where corn is rarely grown, in the wilderness area of northern Minnesota.

The Unpredictable Worm

The borer is an eccentric, and when you think you have him nailed down, he pulls a new trick. Even in heavily infested areas he will skip a farm or a field. Phillip Yeager, Hazelwood, Ohio, says, "We never had 'em before this year although neighbors all around had them. Now this year, they don't seem to be going down the center of the stalk. They go in and work

THE TELL-TALE SPOR of the borer, often the first visible sign that he is working a crop. Why the newly-hatched worms make the neat rows of bites is a mystery.

NEWLY-HATCHED BORERS on a leaf, many times enlarged. They take their first meals off the leaf, then enter the stalk. Once inside, no insecticide can reach them.

THE SHORT AND HAPPY LIFE OF THE BORER: The female moth (top) and the male (left center) have a romance. The female lays the eggs on the under side of a leaf, the caterpillar hatches, eats his fill from stalk and leaf and ear; goes into the pupae (lowest in the stalk) stage, emerges as a moth, completing the vicious cycle.

up the stalk to the joint but won't go through the joint. They work out and burrow up under the skin then back into the stalk. I first noticed them about July 12. The young tassel was forming under the leaves and the worm would be just laying there on the tassel. The corn looked pretty bad and I felt rather sick about it. If it hadn't been for this rain we've been having that made the corn grow fast we'd have been in a hard way. Now I don't think it hurt us much at all. When I first noticed them, I called the county agent. He said, he didn't know anything about them going to the tops like that and called Columbus. They said that when they get to the top they go into the moth right away. We had a lot of pumpkins in here last year and I think they wintered over in the pumpkin vines. Another thing in our favor here is that this is good ground. Raised 90 bushel to the acre last year and will probably turn right around and do the same thing this year."

A Borer At Work

A field in which corn borers average one per plant may show little effect from the insect, but where borers average three to a plant field corn yields have been cut 10 per cent. Heavier infestations of 10 to 20 borers per plant will cause complete loss of the crop. Light infestations are more damaging in sweet corn, because even lightly damaged ears are unfit for canning.

The first outward sign of injury to young corn plants will be small scars in the leaves. Soon "ragging" of the leaves becomes evident as the borers feed within the unfolding leaf whorls. Then comes a whitish frass thrown out of borer tunnel openings in various parts of the stalk, broken leaves resulting from the tunneling of small borers in the mid-ribs, broken tassels, and, as the season progresses, prematurely lodged stalks and fallen ears.

When the infestation is heavy the borers work so rapidly and the injury to the field is so great that a farmer can almost see his corn stalks breaking down before his eyes. In lightly infested fields there usually are few or no obvious external injuries to indicate the presence of borers.

The nature of the injury to a corn plant depends to a large extent upon its stage of development when attacked. Young borers working in the whorl or the tassel are not too serious. But later, once they have entered the stalk in sufficient numbers as the ears are developing, the result will be small ears, "nubbins," or "chaffy" corn, or even no ears at all. A single borer may not consume enough of the pith inside a corn stalk for much external damage to appear, but when several borers attack the same plant the stalk frequently is so weakened that it breaks over in the slightest breeze. Borers also may so effectively cripple the tassels in a cornfield that pollination is not complete, or so weaken the shanks attaching the ear to the stalk that the ears fall off.

And what a borer doesn't do to a stalk of corn, molds may do. Every borer, upon entering a stalk, leaves behind him a tiny hole through which molds may enter and cause further damage. In fields heavily infested with borers, stalks are frequently badly decayed by molds that multiplied in the caterpillar's burrows within the plant. Late summer and fall rains, raising the humidity, favor the multiplications of mold spores and their spreading and the destruction of heavily infested plants.

From Egg To Worm

The private life of the corn borer breaks down into four separate stages: (1) moth or adult; (2) eggs; (3) larva or caterpillar (the "borer" stage); (4) pupa or nesting stage.

If there are any borers in your corn field they are spending the winter as fully grown caterpillars (small boys would call them worms), largely in tunnels within cornstalks. A few might be hibernating in the thick-stemmed weeds along the edge of the field and a few more in thick-stemmed cultivated plants other than corn, or even in corn cobs. Corn borers will attack more than 200 species of plant in the United States, including broom corn, sorghum, oats, wheat, hemp, potato, soybean, buckwheat, gladiolus, dahlia, cosmos, pigweed, smartweed, cocklebur, foxtail, panic grass and other wild plants growing in or near infested corn fields. Usually infestations in these plants are very light, for corn borers prefer corn.

Young borers or caterpillars, moths, pupae and eggs do not usually survive

THIS DETASSELLING RIG was converted by the Illinois Natural History Survey into a sprayer for the borer. A 50 gallon tank and a four-row spray boom were added with a self-powered unit for the pressure. A boom covering eight or ten rows could be operated from this machine. It is shown in use on hybrid corn on the Black and Abbott farms, Walnut, Ill. The cost of the spray attachment and labor for conversion was $1,300. The big advantage is that it will operate in corn at any height.

MAY
OVERWINTERING BORERS CHANGE TO RESTING STAGE (PUPAE) IN OLD CORN AND WEED STALKS AND SIMILAR SHELTER
THE BORER
RESTING STAGE OR PUPA NATURAL SIZE
JUNE
LAST OVERWINTERING BORERS PUPATE. PUPAE CHANGE TO MOTHS. MOTHS LAY EGGS AND FIRST-BROOD BORERS BEGIN TO HATCH
MOTH
EGGS
JULY
SOME FIRST-BROOD BORERS PUPATE AND CHANGE TO MOTHS. MOTHS LAY EGGS. SECOND-BROOD BORERS BEGIN TO HATCH
AUGUST
LAST OF FIRST-BROOD BORERS PUPATE AND CHANGE TO MOTHS. SECOND-BROOD BORERS CONTINUE TO HATCH AND CHANGE TO MOTHS, MOTHS LAY EGGS, EGGS HATCH
SEPTEMBER
SECOND-BROOD BORERS COMPLETE THEIR GROWTH
WINTER MONTHS
OCTOBER THRU APRIL
FULL-GROWN BORERS WINTER IN CORN STUBBLE AND STALKS OF CORN AND WEEDS

BECAUSE THE BORER keeps a time schedule, entomologists can predict when he is due to begin operations in an area. County agents tell farmers the "best planting" dates.

the winter. Only the fully grown caterpillar is hardy enough for that. Over-wintering in his galleries within the stems of plants, he usually is not affected by changing weather and low winter temperature. Here he has a nice long winter sleep and he doesn't mind if it's cold.

The full grown caterpillar is about an inch long and 3/16 of an inch thick. It has a dark brown or black head and the rest of its body ranges from a dirty gray, to a light brown or pink. There is a row of dark brown spots down the back, but no stripes.

During May and June, as temperatures rise, the over-wintered caterpillars go into the pupa or nesting stage, from which the moths will emerge 10 to 14 days later. During the nesting stage, while it changes from a caterpillar to a moth, the borer appears as a light to dark reddish brown, spindle-shaped case, about a half to three-quarters of an inch long.

In most states the first moths appear in June and emergence continues into July in the more northerly states. They are active only at night and will fly anywhere on their own initiative, from farm to farm, or even county to county. Ordinarily they won't be seen in your corn fields, for they leave the corn before dawn to perch among the weeds or grass. They return to the corn after twilight to deposit their eggs.

The life span of the moth varies from a few days to more than three weeks during which time it may traverse 25 or more miles.

Though usually tan colored, the corn borer moth may range from light brown to pale yellow. There are zigzag dark lines on the outer extremities of the front wing.

Two to five days after they've pushed their way out of the pupa case they have mated and begin their egg laying. The average female moth will lay 400 eggs, though more than 1,900 eggs have been laid by some moths reared under laboratory conditions.

The eggs are laid in small, scale-like clusters, of 10 to 25 each, usually on the underside of the corn leaf along the midrib. When two corn fields are side by side, the moths that come out in June and July will lay nearly all their eggs on the field with the tallest corn. Apparently they prefer to deposit their eggs where their chidren will have the greatest assurance of plenty to eat.

When first laid, the eggs are very tiny and milky white. Soon they turn yellow, and then, from four to seven days after they are deposited, a black spot develops on each egg. This spot is the head of the young borer showing through the transparent sheath of the egg. Borer eggs hatch in three or four days in warm weather and up to six days in cooler weather. For a short period the young borers pacify their insatiable appetites on the surface of the leaves, and then they bore their way into the leaf whorls or other parts of the plant and become internal feeders.

The most vulnerable periods in the corn borer's life is that between the time he hatches and the time he gets inside the corn plant. Three-fourths of a brood may succumb to natural enemies and unfavorable weather conditions during this brief period of a few days. And it is at this time, while feeding on the surface of the leaves or between the leaves in the crown of the plant, that the borer can be reached with insecticides. This is the time to lay him low. Once inside the corn plant, the borer is there to stay until he re-emerges again as a month.

Some Borers Are Different

There are corn borers, and then there are corn borers, for there are two important strains of the pest. The two-generation strain, and the one-generation strain. In other words, some go through two complete life cycles—from egg to caterpillar to pupa to moth—in a year, while others go through but one. Unfortunately for our corn crop, the two life-cycle strain is the most common, which means much more chewing on the nation's corn fields.

Dr. William Bradley of the U.S.D.A. Corn Borer Research Laboratory at Toledo, Ohio, says there may be as many as four or five different strains having

as high as possibly four or five generations a year. These are rarer strains. No doubt variations in the seasons are a determining factor in the number of generations possible.

The caterpillars of the two-generation strain fatten themselves to the point where they are ready for the resting stage by the latter part of July. In a few days the second generation moths emerge to lay more eggs, the caterpillars of which become mature in September and early October, ready to hibernate through the winter in any corn stalks and stubble left in the field.

The single generation strain of the borer spends all summer growing to maturity, and then passes through the winter exactly as his two-generation cousin.

Controls Are Tricky

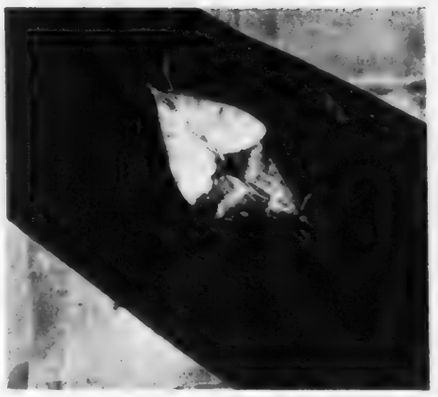
Controlling the borer is no easy task, yet any laxity in control can end in disastrous losses. On the other hand, a heavy infestation of the European corn borer does not necessarily mean that you can't have a profitable corn crop.

It is an uncomfortable fact that corn losses often are much higher in areas only recently entered by the borer and lower in regions where he has lived many years. There are several reasons for this. One is that farmers in newly infested areas usually haven't learned to cooperate enough with each other in controlling the insect by destroying all corn stalks and stubble after each crop.

The complete destruction of all corn stalks as a control might seem to an Iowa farmer like doing a job the hard way. But half way measures don't work on the borer. The reason lies in the borer's life cycle. The caterpillar over-winters in corn stalks, stubble, and, to some extent, in other coarse stemmed plants. Plowing these under cleanly and completely will kill nearly all of the caterpillars, and sharply curtail the egg-laying moth population next June.

But if clean plowing is to be effective, every farmer in the community must cooperate. Corn borer moths will fly many miles to reinfest cleaned up areas. A single unworked field can infest the whole county.

In Ohio there is very little spraying or dusting. The borer is an old story in that state and before insecticides came along Ohio farmers learned to discourage the worm by plowing the stalks under and other cultural tricks. They used to burn the stalks. John Halderman, a Scioto County farmer, says, "We either chop up the stalks or turn them under or feed the corn out of the shock. We keep the fence rows cleaned up and watch our planting time. We think this is the best way in the long run to whip the boror. If we find a neighbor who doesn't work with the rest of us we do some plain talking to him."



BORERS MATING. The female is the larger.

All stalks must be completely covered with soil. True, some of the borers will make their way through the soil to the top again, but if they have no uncovered stalks to bore into for protection, they will die from exposure or their natural enemies will get them.

(Continued on page 118)

THIS NEW CUT-OFF CORN HARVESTER, mounted on a large tractor, cuts the stalk, snaps and husks the ears, delivers them to the wagon, and shreds the cut stalks and delivers them to the ground. Its makers claim 95 per cent of the borers are eliminated. Shredded stalks are good winter cover. Shredder attachments are being made for old type pickers.

WINTER

Some farmers would have you believe that farming is unremitted toil from one year end to the next. Be not taken in by this gentle conceit, for after the sweat and heat of harvest comes winter, a time of ease and sleep for the farmer. He does his morning and evening chores, and an odd job now and then, but when the bad days come and the wind howls in the chimney, he snoozes with his feet in the oven, and the newest kitten purring in his lap.

And well he might take his ease, and well might his conscience be untroubled if he has been a wise farmer and prepared against the season. His stock will be safe and snug, the granary full, and the hams hung in rows in the smokehouse. But if he is not prepared, like the foolish virgin he will pay for his carelessness and his indolence. As he nods by the fire the dumb little field mice will be burrowing beneath the snow to girdle his young apple trees and the disc and the planter he left in the field will be deep with red rust when the snow goes off in the spring.

His good wife may prod him out of his warm corner to buzz up a pile of old fence rails for the kitchen stove, or he may join hands with a neighbor to cull the woodlot for good trees to sled to the mill. A mild day may prompt him to repair the flood gate where the branch leaves his farm, preparing against the time when the spring freshets will swell the gentle stream to a roaring torrent.

When the country roads glaze over with hard-packed snow he may be tempted to repair the broken runner on the sleigh his grandfather was so proud of when he bought it in the city more than fifty years ago. He will make the easy drive to his neighbor, the sound of the bells bringing the women folk to the windows. But when the frost nips his nose and his ears he grows impatient with the old mare, and makes a mental note that the new coupe in the shed may not be as quaint as a sleigh with a hand painted sunset in oil, but it comes with a heater.

He eats big meals and his wife indulges him with the vittles he likes best. He loiters at the table, remembering how in planting and harvest he ate and ran. He may become a problem to her, under feet the better part of the day, and by the time the back of winter is broken, along about Washington's birthday, he will be happy to start the spring plowing.

But if you are not farm born, don't be taken in by him. Farming is a snap in winter.

Most farmers like a big corn crop for the extra cash, but Wayne Smith (right) Tennessee farmer, boosted his per acre harvest to 148.7 bu. because he didn't like to chop morning glories.

BIG CORN

BY CLIFF ALLEN

IN Iowa a 150 bushel corn crop is not uncommon, but in eastern Tennessee, where they say corn is planted on the hillsides with a shotgun, it's a minor miracle.

Wayne Smith, who lives on a rocky, hill and dale farm near Knoxville, did it in 1947, bettered his record in 1948, is so cocky about his accomplishment that he believes he can make 175 bushels in 1949.

Smith's big corn crop was inspired by morning glories. As a farm boy swinging a hoe in the corn fields, he developed an aversion to morning glories. During the war when labor was scarce he saw them take over his corn field and decided if there was a way to grow his corn needs on less acres he would have less morning glories to deal with. "I spent ten years fighting a battle to keep even with the morning glories in my corn," he said, "and I decided that if I could raise more corn on less ground, there'd be fewer morning glories to chop out by hand."

His reasoning was simple and realistic and just as good for the Iowa or Ohio or Michigan farmer as it is for the Tennessee farmer: "Put enough plant food in the ground to grow 150 bushels of corn, and if you're a good farmer and the weather gives you an even break, you'll harvest 150 bushels."

Down in eastern Tennesse, where the hills pile up on each other and slopes run to all points of the compass, the farmers are going to grass. Corn comes in small patches—three, four, and five acres—on the small bottoms. Bigger yields have been rung up in the two-foot deep black soils in the corn states of the Midwest, but Smith went to bat with two strikes on him. His soil is thin and exhausted; he had to put in almost everything the one crop needed. But Smith's treatment is just as good for a 100 acre field as it is for a 4 acre field—and chances are the Midwest farmers won't be plagued by morning glories.

Smith's first tool was a slide rule. A stub of a pencil and the barn door will do, but Smith, being a civil engineer in his spare time, used a slide rule. He

sat down and went over his situation, his fields and their fertility, his needs and what he knew about growing corn.

He has a 190 acre farm, much of it so hilly that it is kept in permanent pasture. He runs 38 head of cattle and markets his crops via the milk bottle. He puts up some corn silage, generally has a few acres of oats, and takes off a crop of alfalfa and mixed hay. He normally needs 500 bushels of corn to feed his herd and for the eleven years he has been on his farm he has planted seven to twelve acres to meet this requirement. In 1946 he put out seven acres and got a bumper crop of 72 bushels per acre, a high mark for Tennessee where the average yield is 28 bushels.

He figured that if he could harvest 500 bushels of corn from half his customary acreage he would have less work, he could release a good field to another crop, and his morning glory chopping would be reduced by one half.

To understand the peculiar problems under which east Tennessee farmers work, you must know the soil. Much of it on Smith's farm, as on hundreds of other farms through east Tennessee, is laced with outcroppings of limestone. It makes good pasture, but the spots in the country that will support corn are as scarce as Republicans in Georgia.

The four acres he selected for his experiment comprise a small flat, with gentle surrounding slopes. The soil is known as Hermitage, a development of Emery, which in turn, is soil that has drifted from other slopes of heavy, dark red soil.

The four acres had been in alfalfa since 1940, which after six seasons was no longer vigorous. On the four acres, Smith set as his goal a crop of 125 bushels of corn per acre to produce the five hundred bushels he needs for his stock.

He took his slide rule out of his hip pocket and sat down to figure the amount of fertilizer he would need to grow 125 bushels of corn per acre, based on the amount of nitrogen, potash, and phosphate that each bushel takes from the soil. He had in front of him a quantitative soil analysis made for him by soil chemists of the Extension Department of the nearby University of Tennessee at Knoxville. He had also the fertilizer recommendations of the Department. These tests showed very low potash and phosphate reserves in the soil. The pH, while on the borderline for corn, was regarded as satisfactory. Top soil analysis was pH 6.7; subsoil pH 6.9.

In figuring the amount of plant food needed for 125 bushels of corn per acre, he used a chart prepared by the American Potash Institute, Inc. The chart is based

"SMITH'S SYSTEM" caught on fast in Knox County. His kid brother, on a neighboring farm added some twists of his own. There are four ears of corn forming on this stalk.

on sixty bushels per acre. On that basis, and using his invaluable slide rule, Wayne reduced the amount to that needed by *one* bushel of corn. This gave him 1.58 pounds of nitrogen, .59 pounds of phosphoric acid, and 1.16 pounds of potash. He multiplied the nitrogen figure by 125 (by slide rule of course) and arrived at a figure of 196 pounds per acre. But he didn't put that much on his soil. He figured that the sun and the rain and thunder storms would supply twelve pounds of nitrogen, while the manure (four tons per acre) would give him another forty pounds per acre. Then, in the form of cyanimide and commercial fertilizer, he spread 163½ punds of nitrogen per acre. That gave him a theoretical surplus of 19½ pounds of nitrogen per acre. Allowing for leaching, he figured that he had plenty of nitrogen for the corn's requirements without throwing away too much. Since his corn showed no signs of nitrogen deficiency, his figures must have been correct.

He followed the same procedure on other plant food. His slide rule told him his corn would need 74 pounds of phosphoric acid. He applied 99 pounds per acre. His corn would require 145 pounds of potash per acre, but here he had to short his slide rule figures. The best he could do, so far as potash was concerned, was 125 pounds per acre. There wasn't any more to be bought in that county.

Having made his calculations, he checked his own figures against those of the University. University experts recommended that he apply five hundred pounds of 3-9-6 or 4-8-8 commercial fertilizer per acre; that it be applied deep or beside the row, so as not to come in contact with the seed. A side dressing of 150 to 200 pounds of nitrate of soda was set up for the later growing season.

Smith revised these figures upward because he thinks the professors failed to allow for fixation of plant food in the ground. It is his theory, acquired from the County Extension Service, that while fertilizer must be applied every year, you must have the variable range of plant food at a high level, rather than so low

(Continued on page 135)

SMITH SAYS it takes no more work, and costs no more proportionately, to raise 150 bu. per acre on the largest fields. In the corn belt, where the soil is richer, higher yields are probable.

UDDER SUPPORTERS STOP SUCKERS COLD, whether they are self-suckers or older calves trying for a between-meal snack. They also help prevent breakdown in heavy producers and protect udders from teat injuries that may cost the owner his cow.

Bras for Cows

BY GRANT CANNON

WITH the heavy uddered, new look in dairy cows that breeders have been developing for the past hundred and fifty years it was bound to happen. Milk production cannot jump from a few quarts a day during the summer to many gallons a day without a corresponding increase in the size of the udder. With greater size and weight there was bound to develop udder breakdowns and injuries. The old timers would certainly have raised a shocked eyebrow at today's solution to the problem, but brassieres for cows, udder supporters they are called, were bound to come.

You can almost hear the explosion of your great-uncle Hobart over such a new fangled development, "Them critters sashaying around in canvas and buckles and straps. Next thing you'll be doin' is putting corsets on pigs!"

But the old timers were usually quick to save a greenback and could appreciate anyone else with the same tendencies, so Uncle Hob wouldn't have felt so badly about the udder supporters if he could have talked with Lee Williams, of Alexandria, Ohio, who uses them. Williams had lost two registered Jersey cows from cut teats before he turned to udder supporters for protection.

"In the winter time," Williams explains. "I keep the cows in the barn most of the time. Naturally they will lie down and rest and when they get up, some of them that have just dropped calves and have extra big udders are liable to step on their teats and cut them. That is the way I lost Frenchy and Daisy. Both of them cut their teats so badly they couldn't hold milk in that quarter. We doctored them but they got infection in their udders and

I had to sell them to the yards. Now my cows wear their udder supporters for a couple of weeks to a month after they calve and it gives them protection. Come on down to the barn and I'll show you what the rig looks like."

Williams led the way to his immaculate barn where we were soon joined by five boys, sons of Roy Tanner, Williams' hired man, picking their barefooted way gingerly over the gravel driveway, eager to see what was going on, but shyly preferring to watch from over the top of the feed bin.

"I'm using two different types of supporter," Williams said, pulling a white canvas harness and brown udder bag out of a box, "the Tamm here and a Jen-Sal that's put out in Kansas City. The Jen-Sal is built to be used for holding hot water for the treatment of infected udders and doesn't have the full harness like this one, but I find I can use it as a supporter on some of my cows if they've got big enough hips to hold it on. You can use the Tamm for hot baths too, they say, but I haven't had any infection in the herd since I got them. I'd better knock on wood. I don't suppose there is any need to mention it but, if you are using the supporters on more than one cow, you should certainly sterilize them before each using.

"They claim that they help prevent udder breakdown and protect the teats from barbed wire cuts in the pasture but, with the Jersey, we don't get breakdowns and any farmer that's skraggly enough to leave loose barbed wire laying around in his pasture wouldn't have sense enough to buy an udder supporter. They would be good though, if you had a blueberry patch the cows could get into. Blueberries will give them some really painful scratches and turn milking into a wild animal act."

By this time Delbert, the oldest of the Tanner boys, had brought in the cows and Williams put on the udder supporters to show how simply it could be done. The cows stood for the fitting with the placidity of club women in a beauty parlor. "When we milk we leave the harness on and unfasten the bag and roll it back so it is out of the way. It keeps the udder clean but that isn't so important since we wash all the cows anyway. One thing that it will certainly do is to stop a self-sucker cold."

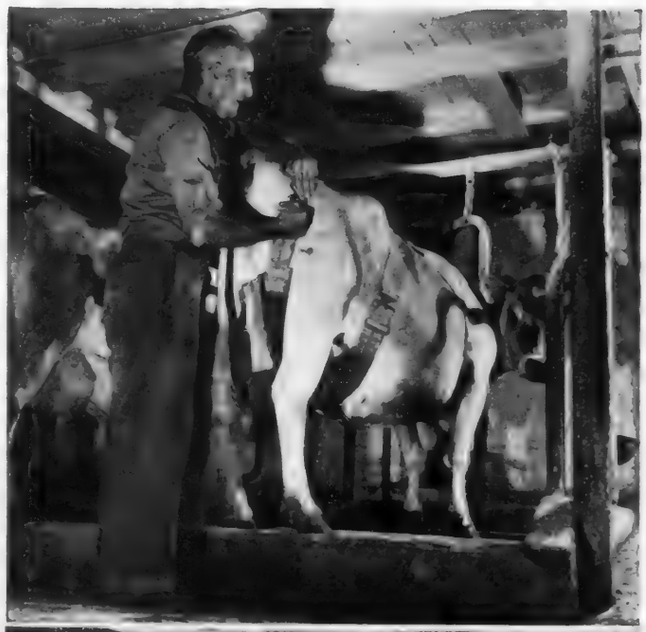
Jim Horace, of Sweet, Kentucky, takes a different view of the udder supporter. "Mind now, I'm not straight out against udder supporters," he says, "but they should come with better fasteners made of steel wire instead of cast iron. Maybe something like the buckles on galoshes. And the instruction leaflet should have pictures to show how to put them on, not just word directions."

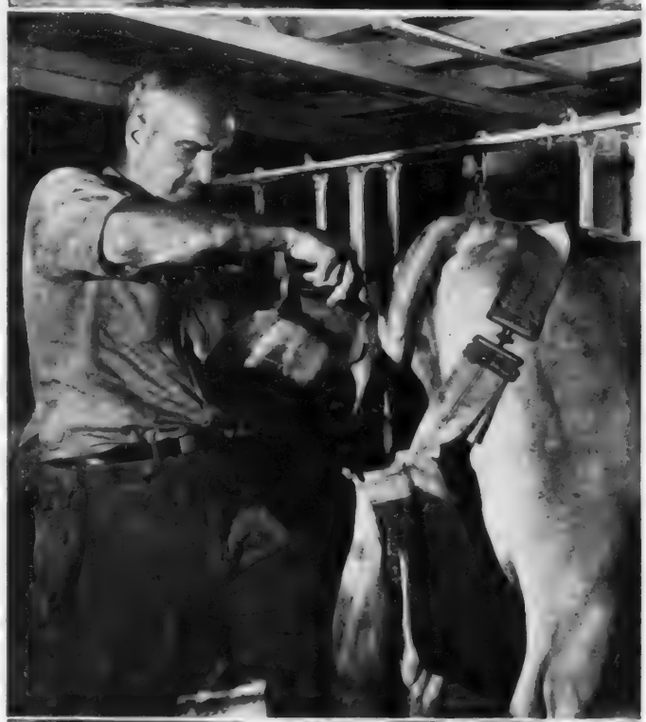
Horace had tried one of the udder supporters on a registered Guernsey, Martha's Rose, who was slated to go to the market because she was a self-sucker.

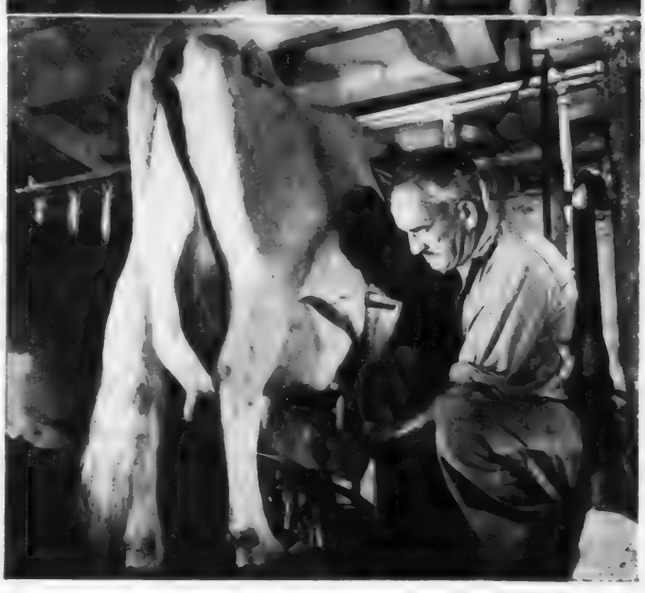
"Martha's Rose didn't even look at the udder supporter when we put it on," he said. "She stood in her stanchion in the milking parlor and ate her grain while we hooked it up. I hayed the young stock and then came back and let her loose. She backed out of the stanchion with her head down and then acted like she was in a rodeo. She bucked and kicked and ran into the barn lot and rolled on the ground, busted two of the fasteners and kicked the udder supporters over her hind end. Well, I caught her and put her back in the stanchion and got some horseblanket pins and put the supporter right back on. I gave her hay and figured to let her stay there a few days to get used to it. By morning she had worked on that canvas bag until it looked like ribbon."

A friend of Horace's, Glen Boyd, who saw the whole show, commented, "Guernseys are just nutty. I can put a hula skirt on a Jersey and they won't care. You have to use your head when you order an udder supporter, Jim. Get the right size. Nine out of ten cows won't mind them at all."

One of the manufacturers of the supporters, William Tamm, claims that he has received more kidding from his friends than a newly wed growing his first mustache. "I don't really mind, of course," Tamm says, "because I think I've got something that many dairymen will find useful." ★ ★ ★







LIKE A DROP SEAT UNION SUIT the udder supporter buttons in back. When the vet prescribes heat treatments for mastitis the canvas bag will hold warm water around the infected teats. The bag an be rolled under for milking without taking off the harness.

Stop those gullies

—and make them pay a profit!

● Erosion had been ruining this farm. Much of the valuable top soil was already washed away. But the owner decided to do something about it. He planted hillsides and gullies with black locust and ash and built a fence to protect young trees from livestock.

This picture was taken two years later. The trees have taken hold and show excellent growth. Black locust has an extensive root system that binds the soil and reduces erosion damage. It improves the soil by adding nitrogen. What was once ruined and waste land will give an income through production of wood products for home use and sale.

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OZARK VINEYARDS

(Continued from page 30)

span of your children and grandchildren. As Tony Fiori, who won this year's grape growing contest, says, "In Italy we know that well-cared-for vineyards last hundreds of years. The vine is not like a tree, which dies if you cut off the top; you prune away old vines and let new shoots grow and you have young vines again. Always a young vine with old, old roots."

With great care the new vineyards were laid out on the gently rolling land around Tontitown. Here they need not worry about terracing or following the contour, for the drainage is good, but very gentle. The straight rows all run north and south to insure even distribution of sunlight to all parts of the vines, and provide for maximum movement of air among them. Ventilation is essential to avoid rot and frost damage.

In Tontitown there are no hired hands, except for a week or two at harvest time. The large families provide plenty of labor, for the size of the vineyard is tailored to fit the family who will operate it. Twenty acres is about the maximum. Many families are sustained on ten or even less. A young man might over-expand with the hope that he will have a large family but most growers are cautious about planting more than they can care for. As Fiori said of his son, who returned from the Navy and rented three vineyards to operate, "The young have big ideas—and they sometimes fool you and carry them out."

Vines are planted about seven to eight feet apart, in straight rows that are spaced 10 feet apart. Some of the older vineyards were planted 50 years ago, in closer set rows, before the wide use of mechanized farm equipment. These older vineyards must be harvested with horse-drawn sledge because of the close spacing of the rows. The cutting is set in a foot deep furrow that has a floor of manure or nitrogen phosphate. The cutting is placed with the roots spread naturally, to a depth slightly greater than that at which it was set in the nursery. The furrow is filled with moist topsoil which is carefully firmed with the feet. The new vine is pruned to one spur, which is shortened to two buds.

During the first season one cane is allowed to develop and is tied to a stake. When it reaches six feet the tip is cut to stop vertical growth. After the erection of a trellis, during the dormant season of the first winter, all lateral branches from the new trunk are shortened to two or three buds, and the cane tied loosely to the trellis wires.

During the second growing season the shoots from the trunk and spur are allowed to grow as they will. Blossoms are pinched off. Allowing them to bear the second summer would not only delay the full harvest, but would permanently weaken the vine

Because home propagation of cutting delays setting the vineyard for a year, most Tontitown growers prefer to use good nursery stock which is relatively inexpensive. If, however, he has a particularly vigorous or favorite vine (and the grower knows each row and each vine as an intimate friend) which he wishes to propagate, he will produce his own cuttings.

In the third dormant season, and every year thereafter, the vines must be pruned ruthlessly. The old producing laterals are cut away, leaving four new canes to produce the crop. An unpruned vine will kill itself with overgrowth. An improperly pruned vine is unproductive. The mature Concord vine will support about 60 leaf and shoot buds. Vines of unusual vigor will support as high as 80 buds on the four canes. "Pruning and tying are the hardest work of the year," said Memo Morsani. "It used to be a man could prune one-half acre a day, a good pruner, of course; now you must carry a stick with you to get any work done."

Winter Work

During the frosty winter days, after the pruning has been done and the old wood hauled away, the remaining canes must be trained to the trellis wires and tied. A few of the growers use the two-wire, four-cane "Kniffin System" in which the canes are tied out straight on the wires. Most of the growers, however, have trained their vines to the "Fan System" in which three wires are used and the four canes are first looped over a higher wire and

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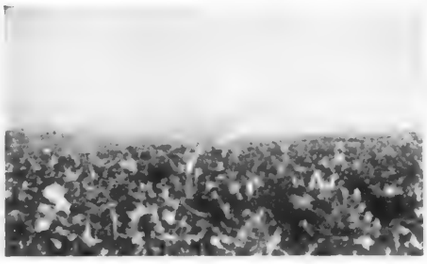

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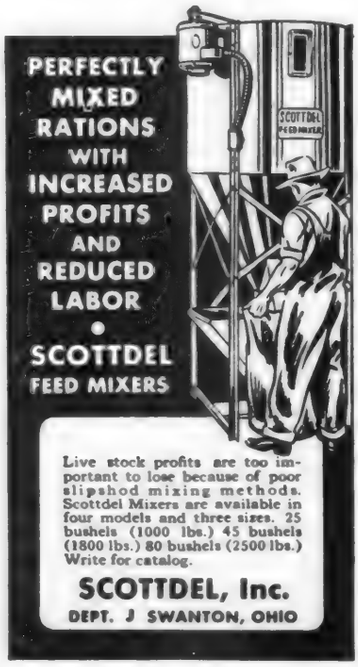
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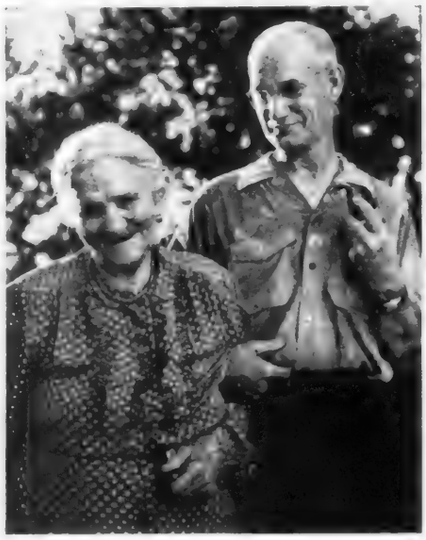
then tied to the wire below. Most of the growers have experimented with both systems and believe that the "Fan System" is better for them.

One of the first plants which the early settlers received from Italy was the Italian Willow. Today they use withes from this tree to tie their vines. Willow and fennel grass are used in this tedious operation, for which no mechanical substitute has been devised. It is a skill highly developed among the older growers. The canes are tied to the trellis gently but securely to protect the vines from the winds and to make sure that the leaves and fruit will be evenly exposed to the air and sunlight. Later the vines themselves will reinforce



VIRGINIA MORSANI, OLDEST CITIZEN of the town, with Father Schaefer, the pastor.

the ties with their clinging tendrils. Tying is, of course, done year after year with the new growth. Repairing the trellis, setting in new posts, tightening the wires and restapling is done after the vines are pruned, but before they are tied.

Cultivating the Vineyard

In the late summer, vetch, rye, cowpeas or clover is planted between the rows as a cover crop to prevent erosion and to add humus and fertility to the soil. Spring cultivation starts in late April or May before the cover crop starts sapping the strength of the soil. The crop is turned under with a shallow turn plow and a long-handled hoe is used to chop out the weeds and straggling peas or vetch that are growing on the row between the vines. Diseased grapes known as mumies are turned under so that the new crop is not infected. During the summer the rows are disced to keep the weeds down. Most of the work is done with tractors and modern machinery, but Tontitown still has many horses to cultivate the old narrow-row vineyards.

Francisco Baudino, who describes himself as a one-horse farmer, pats his chestnut mare affectionately and says, "We manage to take care of 20 acres of grapes together." This would be a large vineyard even

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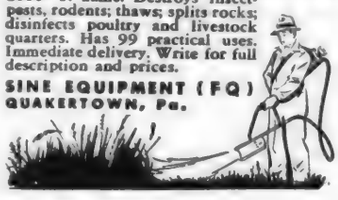

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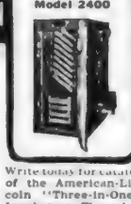

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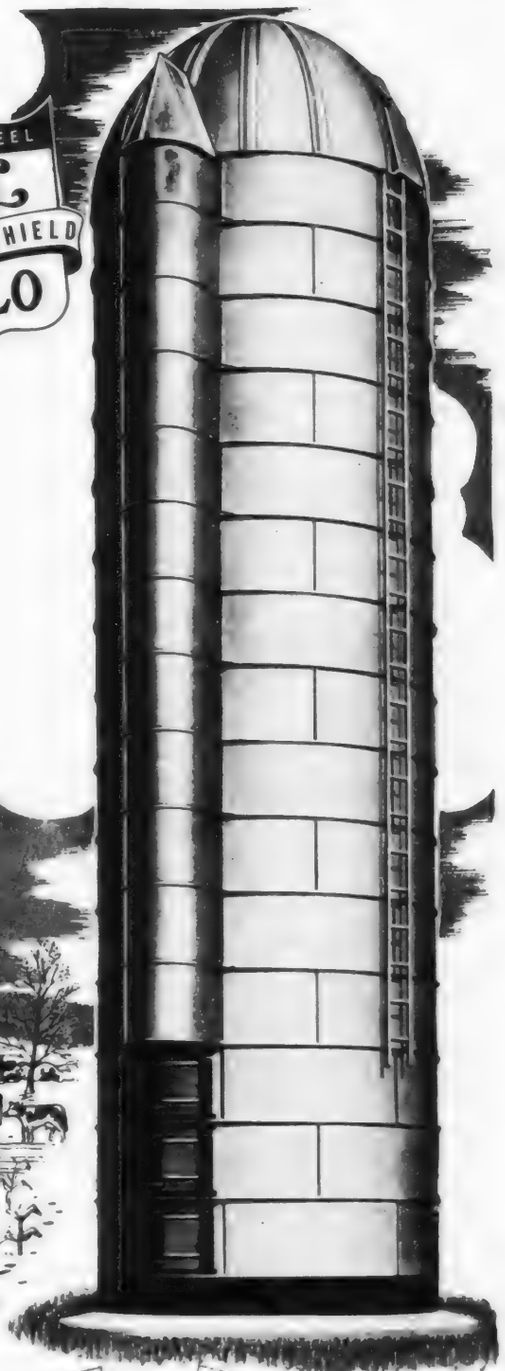

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with tractors. Some of the horse-cultivated vineyards still practice the old system of planting a row of vegetables between the rows of grapes, which would be impossible if a tractor were used.

We Bought Bordeaux

Each spring, about a week before buds open, the Bordeaux spraying begins. The

Father Pietro Bandini

"Perhaps, in time, I can go back again to my other work," Pietro Bandini, founder of Tontitown said in 1908, "but this is so big, this little place..." Father Bandini was unanimously elected Mayor of the village and was consulted on all matters. He influenced the railroad to bring a spur line to the town and managed to get a post office for his people. But most important to him was his job as village priest.

Father Bandini was born of a noble family in Forli, Italy, in 1853. He studied for the priesthood and, after his ordination, he began teaching. He rose rapidly within the church and, at a very early age, was made president of a college in Tuscony. His essays on the problems of the Italian emigrant led the government of Italy to send him to New York to further his studies.

In America Father Bandini organized the St. Raphael society to help the Italian emigrants, and worked very closely with the immigration service of our government. It was during this time that he met many of the settlers on their way to Sunnyside, Arkansas. Learning that these people were in trouble, he hurried to help them —and spent the rest of his life as their leader.

His work in this obscure village did not go unnoticed. In 1905 the Italian Ambassador visited Tontitown. Queen Margherita and Pope Leo XIII sent him presents and the Italian government had a special gold medal struck for him.

When asked if he regretted giving up his former life, he smiled and said, "It does not seem to me as though I had left a larger for a lesser career."

Father Bandini died in 1917 and is buried with his people in Tontitown. "He was the loveliest man I have ever known," said one of the colonists, "he was so proud of us, we just had to make good."

mixture contains approximately four pounds bluestone (copper sulphate), six pounds of dehydrated lime, one and a half pounds of arsenate of lead, and 50 gallons of water. The spraying continues at two-

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Clinton engineers have designed these 3 quick-starting engines to give sturdy, dependable service in whatever fields their horsepower ranges are needed. Sold world-wide (service anywhere) Clinton Engines are performing daily in many versatile capacities. Uses include installations for tractors, generators, refrigeration-compressors, grain augers, elevators, pumps, small boats, construction and concrete machinery, mowers, scooters, etc.

Some desirable wholesale distributor territories are available. Also, some counties still open for authorized service stations.

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CLINTON, MICHIGAN

week intervals until the grapes are almost ripe. After the fruit is formed a pound of resin fish-oil soap is added to each 50-gallon mix to make it stick to the grapes. If any leaf hoppers are found in the vineyards the farmer adds nicotene sulphate to his spray to liquidate them.

Spray is applied with a tractor-drawn. canopied power spray. The canopy, plus multiple nozzles, assures penetration to every part of leaf and vine. It is an exhaustive and expensive operation, but the Tontitown growers know that it is a poor place to economize.

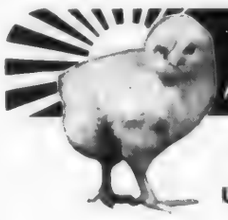
Marketing the Grapes

Packaging of small baskets for the retail trade tapered off after 1921 when the Welch Grape Juice Company built a plant in Springdale and started buying grapes by the ton. Now housewives in Fayetteville complain, "Here in the heart of the grape country, we can't buy a basket of grapes for jelly!" This is not altogether true, but it is a little hard to buy grapes direct from a Tontitown grower. He has learned that the difference, if any, between what he can get from the retail market and what he gets by the ton is more than consumed by the cost of picking and packing into the small baskets. He now picks into 25-pound lugs and almost 100 per cent of his crop is contracted for in advance by the Welch Company. During prohibition the market went so low for grapes that the more growers picked the more money they lost on the cost of picking and packing done. Some of the men were about ready to pull up their vines and try a new crop. One year Memo Morsani took out a truckload and offered them at a nickel a basket, with baskets costing two cents, and couldn't get buyers. With the opening of the wineries the grape market improved. A peak year was 1946 when the crop sold for $128.00 a ton. With vineyards producing from three to five tons of grapes an acre, Tontitown was prosperous.

Harvesting is one of the few operations that requires the hiring of outside labor. If the harvest is delayed too long after the grapes are ready or if there is too much rain just before they ripen, the grapes swell to the point of bursting, or cracking as the growers call it. Some of the growers have their spraying done for them, trading their labor during pruning and tying season for the spray work.

Splurge With Manure

The people of Tontitown have brought with them the European's strong preference for animal fertilizers. Mary Maestri, sitting in her kitchen where she is reputed to produce the best Italian food in Arkansas, says, "In the early days when a man had some extra money, and wanted to



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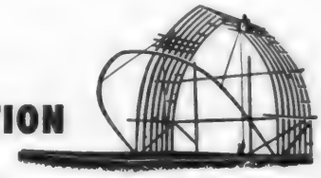
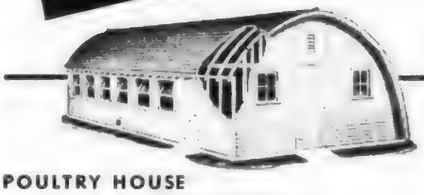
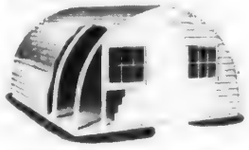
STRENGTH

from FOUNDATION  to RIDGE

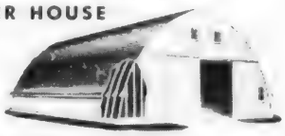
with RILCO *Laminated* RAFTERS



POULTRY HOUSE



BROODER HOUSE



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make a splurge, he didn't buy his wife a new dress or a hat. Oh no! He sent to Kansas City and bought a carload of manure from the stockyards for his land. You couldn't wear it, but everyone knew that you had it on your land and they envied you."

Today the growers use cover crops and chicken manure as the main fertilizers. If they are unable to get the manure they buy a 4-12-4 fertilizer and apply it at the rate of 200 pounds per acre. They fertilize in the fall when they sow their cover crop, and sometimes, if they have the manure, give their land an extra portion in the spring when they plow under the cover crop.

Insurance

Ten years ago a new industry, the raising of broilers, was started to supplement the grape industry. Gene Ardemagni decided, back in 1936, that it would be good to have a second cash crop to back up the grapes in case of failure. "I started out with a few hundred White Wyandotte chicks," Ardemagni recalls, "and found that I could do all right with them. Since then I have built up my brooder houses to where I can handle around five thousand chicks at a time and I brood four batches a year. We use the fertilizer on our grapes and gardens and we are protected if we have a bad grape year. This year is a good example of how it works out.

"I didn't plan to raise any chicks this summer because I have found that they don't eat as well or fatten as quickly during the hot months. But along about May we had a freak hail storm and it ruined my chances for a grape crop along with the other vineyards in a strip on this end of town. It was a little late but I was able to get five thousand chicks and they will help out a lot. With all this rain filling out the grapes to where they are cracking some of the other boys are glad they have some chickens to tide them over."

Ardemagni's comfortable frame house is on the east side of town where the hail hit. The house itself has no basement, but beside it is a concrete cellar that looks a little like a bomb shelter. Remembering the tornado that hit the town the first year and killed one of the colonists, the family prefers to have their underground room away from the house and easily available. In this cellar are shelves of canned beans, corn, tomatoes, fruits and jellies and, of course, wine which the family has made.

The Blood of the Vine

There are three wineries in Tontitown, the two big ones owned by the Granatta and Montegani families which produce commercial fortified wines, and a small one owned by Dick Taldo, who makes a very fine natural red wine. They do not sell much wine in Tontitown, for everyone makes their own.

"Making wine," according to Tony Fiori, "is easy as ABC. If you kill a hog, any damfool can make sausage!! The same with wine.

"Grapes have to be dead ripe and full of sugar for wine," Fiori says. "When we pick for market we leave some for wine. A couple weeks later we pick them. Then we crush them, stems and all, either in a grinder or by tamping them out in a barrel with the bare feet. We don't press out the juice; we put the pulp and stems and juice in a big vat and let it lay there four to six days. We don't add any sugar or water or yeast, just the juice. The pulp and stems all come to the surface and then we draw off the wine from the bottom slowly and put it in barrels. No sugar, no water, no nothing, just the wine in the clean barrels. It ferments there for two or three days without the bung. Then we put in a bung with a little hole in it and a tube with one end in the hole and the other in a glass of water. As it ferments the gas goes through the tube and bubbles out of the water. In about six or seven days it stops bubbling and we know the fermenting is through. Then we put in a new bung and seal it up tight and it is ready to drink.

"As a matter of fact," Fiori admits, "when it comes from the vat into the barrels it is good to drink and will make you drunk if you don't watch out. I like the new wine myself. There are some people who like very old wine and some people who hear

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Farmers, county agents and agricultural experts throughout the country report far greater yields at less cost, from proper testing and feeding of soil. You, too, can increase your returns from the same acreage *and* save money on fertilizer by testing your soil NOW for the crops you'll plant next spring. The first step to bigger yields on your land is correct testing instead of guessing . . . and the Sudbury Soil Test Kit enables you to make all the tests you need, easily and quickly — no waiting for samples to be sent away and returned.

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Test your soil and get back $3.00 or more from every dollar you spend for fertilizer. Trials on seven fields proved that every $14.42 spent on potash and phosphate paid off $43.00 in extra crop yield. In Maine, testing and fertilizing pastures increased milk production of a herd from 33,000 lbs. to 43,400 lbs. This brought $370.00 additional milk receipts per year, at a cost of $74.00 for fertilizer — $296.00 extra profit just by following soil tests! In Tennessee, cost of wheat dropped from 69c a bushel without fertilizer to 32c a bushel with fertilizer.

★ **Save Time, Effort, Money—**
wasted by using wrong kinds and amounts of fertilizer. Harvest bumper crops in every field next summer.

★ **Raise Healthier Stock—**
Experiment station tests and actual experiences of breeders show it is profitable to test and fertilize meadows and pastures. Herds grow faster, heavier and healthier when grazing on tested, fertile soil. Poor soil can even cause poor breeding.

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Illinois farmers could have been five million dollars richer in 1947 if they had tested their soil and applied the right kinds and amounts of fertilizer, instead of guessing. In making this estimate, soil testing specialists said that accurate testing saves the average farmer $50.00 for every $1.00 spent on testing; it also increases food production by using every ton of fertilizing material where it will do the most good.

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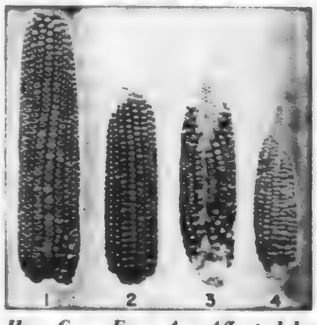
This is the progressive way to farm, so don't wait — send this coupon for your Sudbury Kit today. You'll use it every season for years.



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At the same time, there has been a decrease in the cow population on farms. And unless this continued downward trend is halted now, the milk deficiency will continue to grow.

Dairying, as a long-range source of farm income, never has been more attractive. Prices received by farmers for milk, over a long period of years, show that the dairy cow is the steadiest year-round source of income—in addition to the benefits to the soil—as compared to most grain cropping.

All this is encouraging to the dairyman who is planning for the future.

Now is the time to review feeding and management; survey the dairy farm with a view to increasing herds; and take advantage of the best long-range dairy marketing prospects ever known in this country.

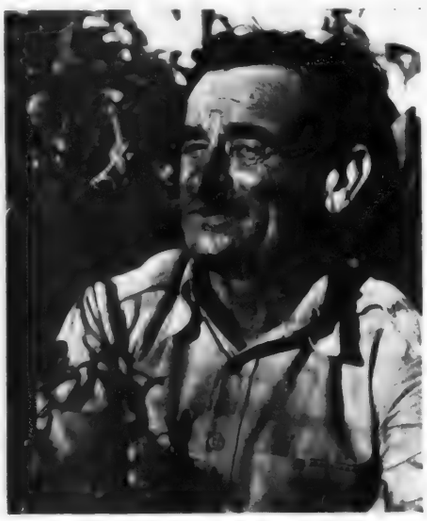
Yours for a prosperous future in Dairying, International Association of Ice Cream Manufacturers, Barr Building, Washington, D. C.

Advertisement

about old wine and want to drink it because it is expensive. One fellow came to me and said, 'I would like some real old wine, price no object.' I said, 'I can get you some but you won't like it.' This fellow says, 'Okay, so it taste like slop to me, I still want some'."

The Second Wave

An Italian school boy, so the story goes, was asked by his geography teacher to name the important cities in America. Without hesitation he answered, "New York, Chicago and Tontitown." This may be fiction, but it is true that Italians, living in Italy and America, heard of Tontitown and some of them migrated there. Francisco Baudino, working in a shoe shop in northern Wisconsin, read of Tontitown in the church paper. "I had gone to Wisconsin right after I landed from Italy to find work. I was a cobbler in Italy and some of the Italians in New York told me that I might find work there. I walked the streets and, one day, I see a shoe shop and the old cobbler has much work piled up around him. I couldn't ask for work since I can't yet speak English, so I point to the shoes and I point to me and start working on a pair. The owner watched me a while and then nodded his head yes. I worked there for a year and a half and then sent back to Italy for my wife and children. She was not too happy up there in the north, so when we read of Tontitown we decide to move here where it would be a little like our old home."



FRANCISCO BAUDINO GROWS most of his own food. Grapes are his big cash crop.

Baudino says his wife was, "The best cook who ever walked this earth. And so economical! She wasted nothing. If she had a little left-over, like meat which does not look so appetizing, what does she do? She boils the big sweet onion, and when it is tender slips the cups from it. She chops the left-over meat with maybe some of the herb and moistens it with the tomato paste, and stuffs it into the onion cups. Over them she spoons some of the salsa that she makes from the meat juices and tomato

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paste and a bit of white wine. Then she puts in the oven for a little while to bake slowly. Over it she sprinkles the grated cheese. It looks and tastes so good!"

From Tontitown to Anzio

When the wars came the boys of Tontitown had no question as to which side they were on. They joined the American forces with their neighbors in Springdale and Fayetteville. During World War I, 18 Tontitown men were in the Army. The Armed Forces took 85 from this little hundred family town during World War II. The only one of this group to lose his life, Virgil Fiori, was killed at Anzio, Italy, and is buried at Nettuno, a few hundred yards from the boyhood home of his Tontitown neighbor, Memo Morsani. Today the common work clothes of the men in Tontitown, as elsewhere are suntans and army shoes. And when the recruiting officer comes to town he is quite likely to hear the old army chant, "You should have been with us when it was rough, Buddy."

THE CHURCH AND PARISH HOUSE are framed by the pillars of the school belfry.

"We are the same as any other people. We look and act the same, do the same things and talk about the same stuff," said Gabriel Pianalto, a young returned veteran, with some heat. "Just before I went overseas a fellow invited me into his home in New York. He took me into the kitchen and turned on the water in the sink, turned on the gas in the stove as high as it would go. Then he said, 'I guess you never saw anything like that before, did you?' Just because he knew I was an Italian from Arkansas! Why, the only thing I can think of that we do any differently is that we loop our grape vines up to the wire when we tie them and most other Americans tie them straight out on

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Be sure to try this amazing new Tomato! The Burpee Hybrid is a true first-generation hybrid, for better quality and extra yield — 20% more than Marglobe or Rutgers. With Hybrid Vigor, the plants grow faster, bear earlier and are heavy producers for a longer season. Round, thick-meated, heavy, scarlet-red, delicious. For garden, market, canning or shipping. Producing the seed is expensive, but we shall be glad to mail you ***10 seeds free to try***—send stamp for postage.

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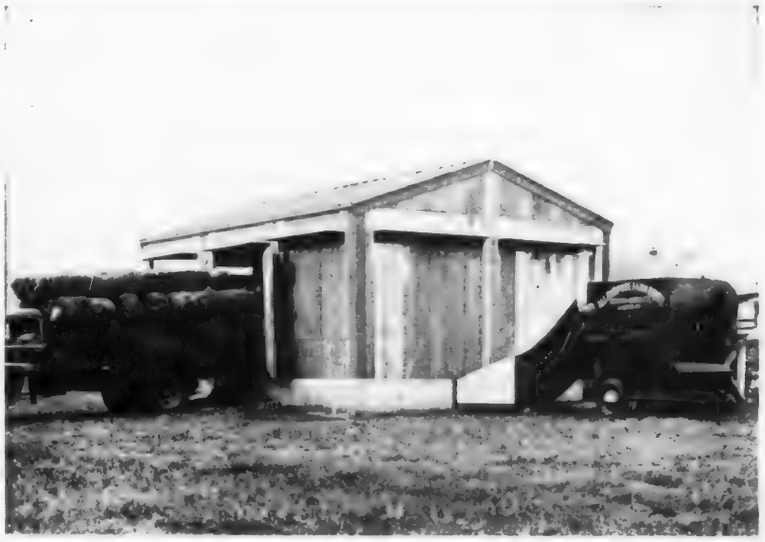

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Essential, too, for Corn, Grains and other crops

● This interesting booklet gives you the entire story of artificial crop drying. It's free. You will be amazed how useful and profitable the All-Purpose Farm Drier can be the year 'round. Write today for your copy.

MOTHER NATURE *Hates* HAY CROPS

● Strange, but true! Weather that grows good hay also destroys it at harvest time. Too often the fate of hay crops hangs on whims of the weather. Rain, too much moisture or a bleaching hot sun at haying time and valuable winter forage is totally lost or damaged.

Artificial crop drying is the biggest new thing in modern farming . . . because it *now lets the farmer control the weather.*

An All-Purpose Farm Drier cures, almost regardless of weather, rich green hay, full of protein and vitamins, sweet with field aroma. Such hay has feeding values two to four times those of field cured hay. Harvests every cutting, too, with just one day of good weather. Write today and learn all the advantages crop drying brings to your farm.

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All-Purpose Farm Driers
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the wire." Pianalto is only half right, for he is "different." In the evening his dinner will be wonderfully flavored with herbs that the early settlers imported from Italy and have been growing ever since. With his dinner he will drink home-made Italian wine as his ancestors have done for generations. After dinner he will bowl a game of *bocce* ball and when the score is close and the excitement is high he will forget his English and will yell to his partner, "Fare il punto" or "sicuro". He lives in a tightly-knit community centered around the church. When Father Schaefer announces from the pulpit that a man in the parish is sick and his vineyards look in bad shape, Pianalto and the other men will go out the next day and take care of the farm. None of them will think this is unusual.

The older people are a little concerned that their children are forgetting the old ways and even the old language. "The young people," they say, "jump in a car and drive away many miles to see a movie or to go to a dance. Always drive, drive. Always in a hurry. They don't know what a pleasant thing it is to walk in the cool evening to a friend's house; to sit and drink a little wine and play *tresette* or maybe just to talk of the old days."

HOMEMADE FERTILIZER

(Continued from page 35)

the same proportions as those recommended for small heaps. Wooden walls will serve but they rot out within a few years. Temporary snow fencing can be used for large pits as well as small ones, helping to make the job both simple and inexpensive.

Pit compost is usually made during one summer for use the following season. Materials should be hauled to the composting area when they are plentiful and other jobs are slack. If the manure needed for the compost is collected during the winter months, the weeds and other green material can be stacked during the summer and the heaps built when the manure is available. Compost will continue to decay slowly during the winter months and usually be ready for use with the coming of spring. If the material is not completely broken down it can be applied to the garden anyhow, for once it is plowed or disced into the soil the decay continues and supplies plant nutrients over a long period of time.

A major part of the task is obtaining and transporting the materials that go into compost. Where farmers keep large compost pits in operation they often grow crops especially for composting. Any crop will serve the purpose including weeds mowed from fallow fields, roadsides or pastures. The main aim is to get a large

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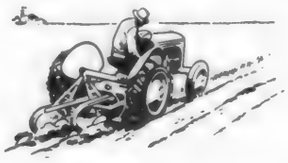

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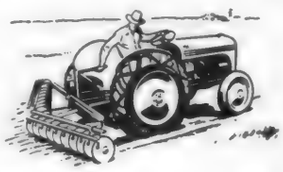

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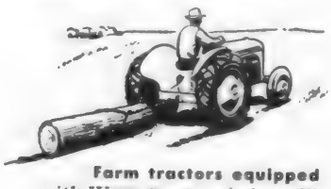

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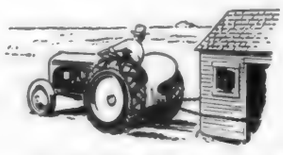

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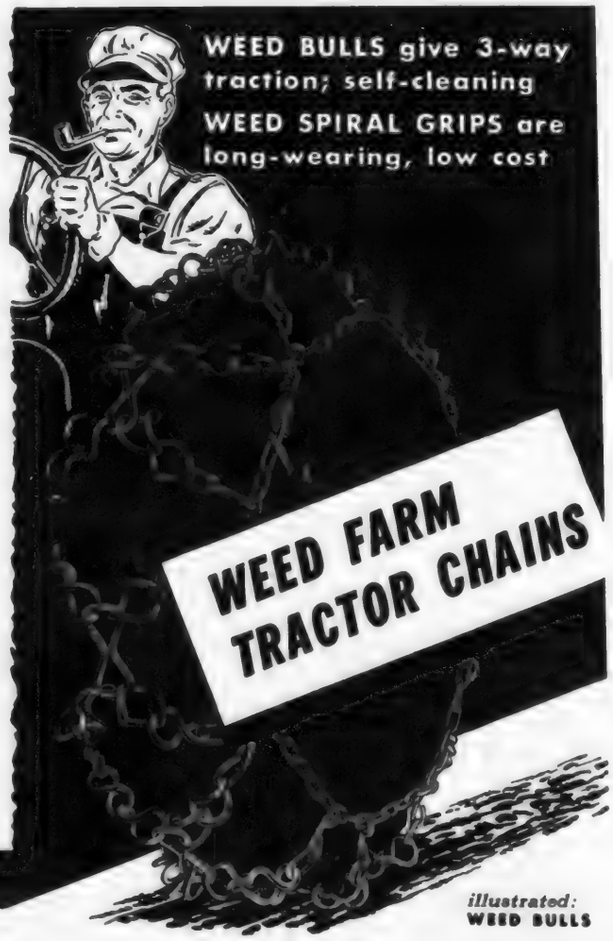

illustrated: WEED BULLS

bulk of plant material and if crops are planted especially for composting they should be those such as rye or sweet clover which produce high yields in weight per acre. If these materials are hauled and placed in the pits on rainy days when they are wet there is little need to add additional water as the heap is constructed.

There is a wide variety of material that can be used in making compost. Farmers who live near saw mills can usually obtain loads of sawdust. Those who live near cotton gins can get cotton hulls; cider mills give away the apple pumice. In hauling and handling these materials the farmer should always include the cost of transportation in determining the cost of his compost and whether or not he can afford to truck materials in from outside the farm.

With large compost heaps the turning process becomes a major factor in the cost of the final fertilizer. The best tool to date for this job is the manure loading attachment for the tractor, which can remove the hand labor from the task and also make a big cut into the time needed for turning.

A well-made compost heap will turn into humus within three or four months if it is kept moist.

Artificial Manure

The farmer who wants to turn his straw crop or corn fodder into artificial manure can mix them with chemicals and let them compost. Some farmers have built or purchased fertilizer hoppers to be attached to threshing machines to mix chemicals with the straw as it comes from the thresher. The University of Missouri recommends 150 pounds of chemical per ton of dry material. The chemical is a mixture containing 45 per cent ammonium sulphate, 40 per cent finely ground limestone and 15 per cent superphosphate. The cost for materials for this mixture is about 60 cents per ton of manure produced.

Spreading Compost

Gardeners, with their small quantities of compost, have little trouble applying it to the land with the aid of a wheelbarrow or a basket. It can then be spaded into the top few inches of soil. For the farm scale compost maker, however, spreading is a major item. The manure spreader is excellent for the job. The compost is usually applied at rates of not less than two or three tons to the acre before the land is plowed or disced. Heavier applications even as much as 10 tons to the acre can do no harm, and the amount the farmer applies usually depends on how much compost he has succeeded in making.

Sheet Composting

Many farmers with large acreage will rule pit composting out immediately because of the labor required. There is, however, still another and simpler method of

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composting organic materials into humus. This is sheet composting, which is the plowing down of green manure or stubble on which has been spread barnyard manures or chemical fertilizers.

There are good reasons for applying additional fertilizers to a green manure crop before plowing it under. Most crops are not rich enough in nitrogen to make humus readily and efficiently in the soil. Unless the additional nitrogen is added, the process of decay in the soil is slow and as a result much of the plant food is lost to the air as carbon dioxide.

Tests have shown that where stover was plowed under with no additional nitrogen, only 17 per cent of the organic matter was left in the soil at the end of the first year. Where nitrogen was properly applied 51 per cent of the material plowed under was still part of the soil at the end of the first year. Another reason for adding nitrogen is that plowing down of plant material low in the element, especially straw, will depress the yield of the following crop. The bacteria and other life in the soil use the nitrogen and leave little for the crops. Where there is competition for nitrogen between the plants and the bacteria, the bacteria always win. The answer is to supply enough nitrogen for both.

Where there is an adequate supply of barnyard manure on the farm the manure can be spread over the stubble or green crop to supply the nitrogen it will need to decay. Manure should be applied at the rate of three tons per acre. Manure, however, is notably low in phosphate and this element should be added to the manure as it is spread. Seventy-five pounds of rock phosphate per ton of manure will fill the gap. Another good practice is to add 40 or 50 pounds of a 5-10-5 fertilizer to each ton. This supplies the phosphate and also supplements the nitrogen supply.

On most farms, however, manure is becoming a scarce item. When the tractor came in Dobbin was consigned to the dog food factory and his former owner started buying more chemical fertilizers. In sheet composting chemical fertilizers can completely replace the manure.

Most green manure crops will turn into humus readily with the addition of 100 pounds of some nitrogen carrier such as ammonium nitrate, ammonium sulphate, or cyanamid per acre. Immature plants have a higher nitrogen content than mature ones and as a result require less additional nitrogen for decomposition. For plowing under stubble straw or leaves the dressing of nitrogen should be increased to 200 to 300 pounds per acre. This need not be a precision matter. A few pounds either way will harm nothing. The main objective is to get the material back into the soil in a combination that will make it turn into humus.

Unless straw or other material is hauled to the fields and spread over the

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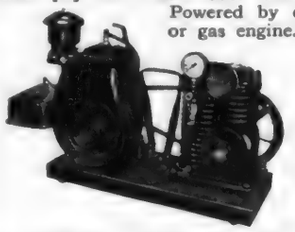

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land the biggest labor problem in sheet composting is adding the manure or fertilizer. The manure would be hauled to the fields and spread regardless of whether or not the farmer was using it for sheet composting. For spreading the fertilizer over the green manure crop or stubble, a regular drill can come into service. A tractor-attached broadcaster will spread the chemicals as the field is plowed or disced and save one operation. The broadcaster can be purchased or built in the farm shop. The hopper bottom, which controls the rate of application, can be purchased alone and the hopper built to fit it.

Sheet composting has some disadvantages, and most of them are connected with timing the operations to fit weather conditions and the cropping system followed. Some soil improving crops will grow best only in those seasons when the fields could be sowed to cash crops. When cash crops occupy the ground from early spring to late fall it is often difficult to get cover crops sown in time to make much growth. Where two cash crops are grown on the same land in the same season sheet composting between crops poses a problem. It takes time for the sheet compost to rot down in the soil, especially when the soil is dry.

Where the directions call for so much manure or so much chemical there is no reason why a combination of the two can't be used. The problem is to break down a large bulk of plant material into humus and how the nitrogen is supplied for the job is of little importance.

The main thing to remember in making any kind of compost is that the rules of thumb for the process are only points of departure. There is no need for great accuracy and a lot of worry, although large operations should be thoroughly planned. If the directions call for 25 pounds of chemical and you have only 20 pounds left, put on the 20 and forget about it. The end result will be compost regardless, and when applied to the land it will help build up the organic content and mineral supply. The result will be bigger yields.

What It Costs To Make Compost

Sheet composting is the most economical method of returning organic matter to the soil. The biggest actual cost is for the chemicals applied to the plants being plowed under. This cost may range from three to six dollars an acre depending on the quantity and quality of the chemicals used. Since each ton of dry matter plowed under will make three to four tons of compost this is a cost per ton ranging from 25 cents to $1.50.

The cost of composting in pits or above ground is somewhat higher and a hard one to calculate. If waste plant materials and manures from the farm are used the major cost is for labor and chemicals. If materials are trucked onto the farm these costs must be added to the total.

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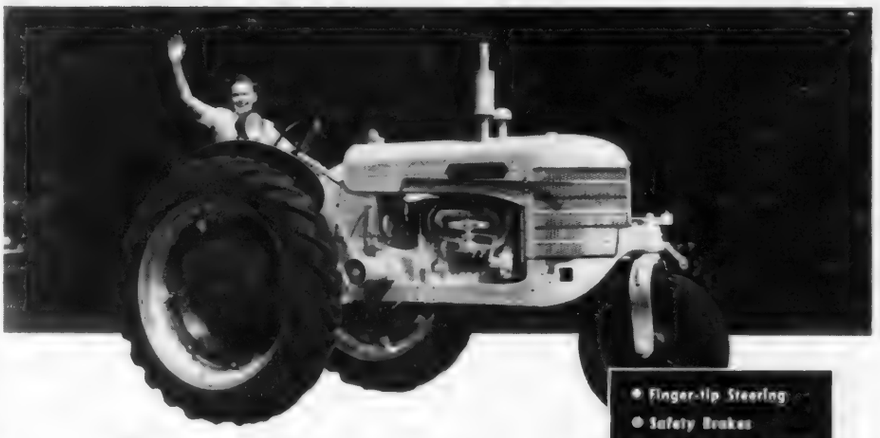

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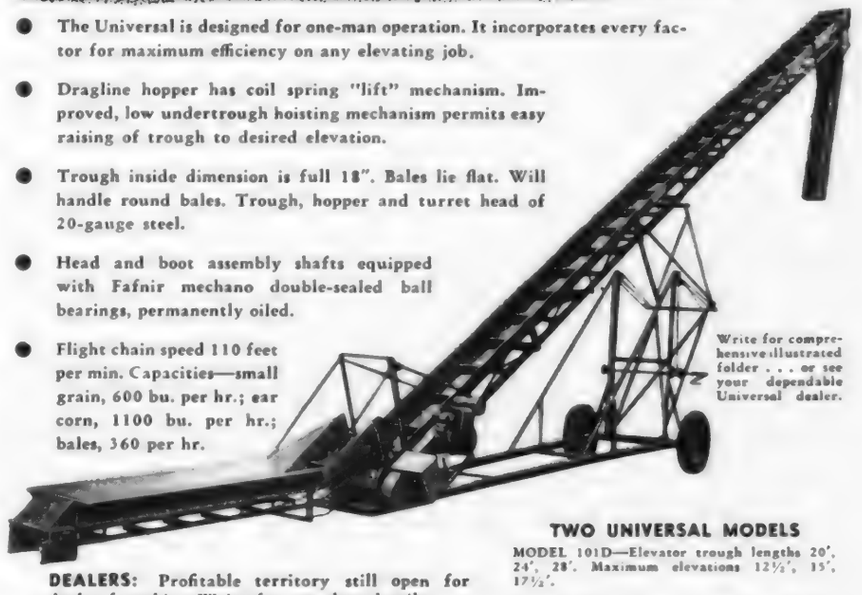

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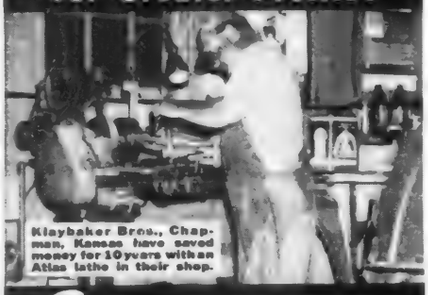

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Home gardeners seldom figure the costs of composting accurately. They figure that if they are not spending time making compost they are spending it some other way and that anything that will make their garden grow greener is justifiable.

Will Chemical Fertilizers Do Harm?

There is a growing group of gardeners in the country who feel that chemical fertilizers are ruining our land as well as the health of the people. The headquarters for this school of thought is at Emmaus, Pennsylvania, where J. I. Rodale, publishes "Organic Gardening," a monthly magazine. The Organics people advocate that chemical fertilizers be replaced entirely with organic composts.

No one denies that organic materials are good for the soil. No one denies that most soils are badly in need of large quantities of organic fertilizers. But, the scientists at the state colleges and various state experiment stations point out that this is little reason to say that the entire load should fall on organics. Chemicals do play an important part in rebuilding and maintaining fertility.

While both sides haggle and attempt to pile up proof pro and con, the farmer can combine organics with chemicals and increase his production. One thing is clear. It is easier for home gardeners to divorce their land from chemicals and use only compost than it is for farmers who cultivate several hundred acres. Where the area is small enough organic material can usually supply all the fertilizer needed. Where the area is large there is usually a place and a need for fertilizers.

One argument advanced by the advocates of "organics only" is that chemicals kill off the biological life in the top soil. There is no proof for this. Chemicals have been used in experiments to increase the life of the soil. There is little difference whether the final plant foods are supplied by organic material or chemical fertilizers. In either case the elements are in mineral form when finally assimilated by plants.

The Worm

The organic gardening people also hold that earthworms play an important part in building fertile soil. These slippery little creatures have been the center of much controversy within the past decade. They have been called everything from "worthless and destructive" to "all-important." Both sides of the question has its advocates and neither has enough facts to give us the true picture on the relation of earthworms to soil fertility.

Earthworms and organic matter seem to go hand in fist. Where the organic matter of the soil increases the earthworms multiply in fields and feed on the organic matter. Whether farmers and gardeners consider this good depends on what they have been reading and to whom they

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have talked, and in some cases on their own experiences.

Vegetable growers in the Cleveland area aren't on friendly terms with the earthworm. By adding five to 10 tons of stable manure to their fields each year they make conditions excellent for earthworms which soon become as thick as they are in bait stores. This, say the vegetable growers, is bad. When they mulch their crops the worms will eat the mulch overnight and mix it into the top soil. The earthworm fanciers say this is wonderful, that the soil is being built up and that the worms are the gardeners friends. But the gardeners come back with word that

Compost is a good mulch for fighting weeds and conserving moisture in gardens.

the labor and mulch which they put on the field must be spent all over again.

Earthworm advocates have become so enthusiastic about their subterranean helpers that they have set up earthworm hatcheries and offer worms on the open market. A few dozen breeders sell them for prices averaging a penny each. They are bought by gardeners, and sometimes even by farmers and orchardists who plant them in their fields. If they plant them where there is insufficient organic material to provide food the worms die or migrate to the neighbor's garden. If the worm purchasers first build up the organic content of their land there is a good chance that local earthworms will come in and start turning the soil.

Earthworms do seem to have a place in compost heaps where they help turn the material and apparently speed up its decay into humus.

Composting is not a new idea. It has been one of nature's methods of building soil since life first appeared on the planet. Leaves that rot down in the forest turn into fertile humus. The tall grasses of the Midwestern prairies died and decayed century after century until the prairies became some of the most fertile land in the world. When a farmer or gardener turns waste products into compost and returns the compost to his fields he employs a plan that has been tested for centuries. The results are more fertile soils and higher yields.

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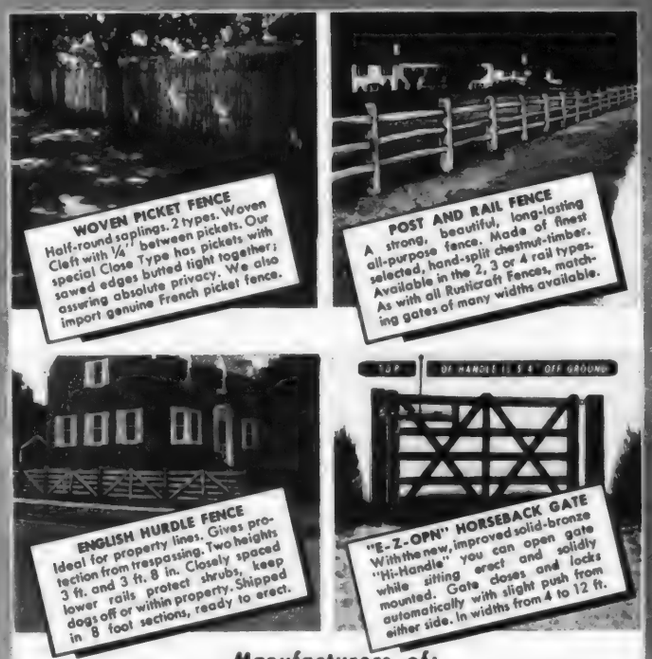

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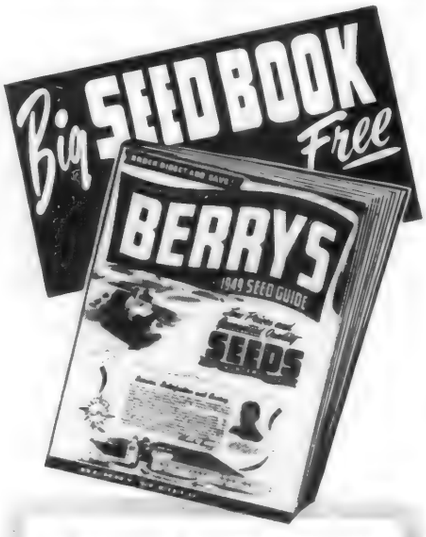

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GUINEA FOWL

(Continued from page 39)

half a piece for them by mail," he says. With a deep freeze unit the guinea farmer could offer the dressed birds for sale right from the farm either at a roadside market or at the house.

Housing is not much of a problem for the guinea farmer. Schadt winters up to 500 in poultry houses that measure 20 by 40 feet. They are a hardy bird and not bothered by winter temperatures.

The farmer who wants to grow guineas but has no poultry shed in which to house them can still raise the birds. Small summer coops for family sized units of guineas have proved successful on many farms. These can be the ordinary inverted V chicken coop. Where the young birds are raised under guinea mothers or chicken hens, the pens should be equipped with small yards to keep the family in during the early part of the morning when the grass is wet. Guineas range far from home and drag their less hardy off-spring along through soaking grass with little regard to perpetuation of the species. At night the coops can be fastened shut to protect the birds from foxes and other meat eaters.

Chicken hens make better mothers for keets than do guinea hens. Most farmers who keep small flocks of guineas for their meat agree that guineas will be tamer if they have been raised with chickens. One Kentucky farmer mixes the eggs and gives the chicken hen a mixed brood of guineas and chicks. Chicken eggs require a week less to hatch so he sets the hen on the guinea eggs and one week later slips a few chicken eggs into the nest. "I usually plan to set her with 18 guinea eggs and four chicken eggs," he said. "When they grow up together the guineas learn to eat and roost in the chicken house and even lay their eggs there."

They Remember Mama

Newly hatched keets should be cooped up with the foster mother for a week or ten days until they learn her call. Once they have become accustomed to her they seldom leave her side. Bantams make good foster mothers for guineas and after the guineas are practically grown they still follow her around the yard even though she's half their size.

Most farmers with small flocks winter the guineas with the chickens. If they have a larger flock of 50 to 100 birds they usually try to give them a separate house. It need not be a castle. A converted shed that will keep out winter winds will serve.

Regardless of the size of the flock guineas should get outside in the summertime. They thrive on good pasture. "I get a kick out of watching them eat," Schadt said. "They like young alfalfa and will clip it off like turkeys. We try to keep our pastures in good shape," he added. "It makes cheap high protein feed."

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Guineas seem to be more immune to diseases than are chickens. Schadt has tested hundreds of his guineas for pullorum and never found a reactor. His birds have thrived on ground contaminated by chickens and turkeys. Other farmers, have found that occasionally young guineas will get coccidiosis. Poultry scientists have done little research on guinea fowl disease, so perhaps the best plan for guinea farmers is to take the usual precautions against diseases until more is known about the subject.

The male guinea looks so much like the female that beginning guinea growers often wonder how guineas themselves can tell the difference. The male has larger wattles than his mate but this isn't an infallable rule. Al France, a Kentucky farmer who keeps a few guineas for meat, caught one of the males last summer and put him in a box out in the barn. The plan was to kill him the following day for dinner, but when France went down to the barn the next morning to get his guinea the unpredictable bird had produced an egg. France forgave her for the trickery and released her to help build up the guinea population.

The male has a slightly different call from that of his mate, which a fine ear can detect. The female call is usually a two syllable "noise" which is approximated by "pot-rack." The male confines most of his vocals to phrases of one syllable, the "rack" syllable of the female call. A flock of guineas in full cry sounds like a rusty mowing machine pulled at a gallop.

There are two common types of guinea fowl raised in this country, and they are much alike. The most common one is the pearl which is the white spotted bluish gray guinea inhabiting barnyards from Great Neck to Gonzales. The other one, and one that is gaining in popularity especially among commercial growers, is the White African variety. The white one is slightly larger. Both have the same habits and there is little to recommend one variety over the other except the guinea owner's preference.

His Personality

The guinea is low on personality. He shows little individualism. He seems to enjoy the company of his relatives and young guineas will stay with their mothers even after they have matured. If they were hatched under a bantam, or other chicken, they stick close to their foster mother.

Guineas are difficult to tame. Usually they stay out of throwing range.Where guineas have associated only with guineas and have the run of the entire farm they may be almost as hard to catch as crows. They can often be taken from the roosts at night if the farmer is willing to turn steeple jack and climb to the top of the old apple tree. Sometimes they can be coaxed into the chicken yard and cornered, but if excited they can clear a six foot fence with ease. As a last resort the .22 can come into play, and in the hands of a good shot, a rifle is probably the surest and quickest way to capture a guinea for Sunday dinner. If you want to take him alive the best plan is to start when the keets are young and raise them with chickens, from which, foolishly enough they seem to acquire a bit of trust for humans. On commercial farms where the guineas are housed in regular poultry houses catching them is seldom a big problem, for they can be shut in at night.

The Gossip Club

All guineas belong to a gossip club. The inventor of the guinea provided them with strong vocal chords. They offer more noise than variety in their vocal selections and sometimes get on the nerves of the people around the farm. As they wander over the fields and along the fences during the day, they keep up a continual chattering among themselves. If a stranger puts in his appearance they attempt to drive him off with the sheer vibrations of their vocal chords, and quite often succeed. In the evening, as they settle on the limbs of a tree or a roost in the chicken house, they rehash the day's activities and spend 10 to 15 minutes telling each other good night over and over.

Not everyone objects to the voice of the guinea, however, for many farmers hold that it adds a bit of rural atmosphere to the farm. Mrs. Howard Fast, of southern Ohio, enjoys having them around. "We never keep many," she says, "about 15, I guess, but

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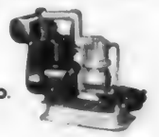

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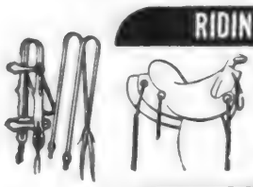

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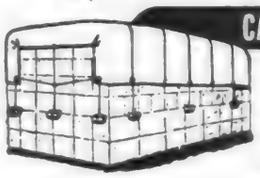

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I like to hear them around. Makes it sound more like a farm."

Hugo Vollrath of Union County, Ohio, is a grain and livestock farmer, but he likes to have a few guineas around the barnyard. "They take care of themselves," he says, "can pick up their feed while they roam around the farm all during the summer. Never hurt the garden either because they aren't scratchers like chickens." This latter point is one of the big arguments that guinea raisers have in favor of their bird. "I never tasted any other domestic fowl to compare with them," Vollrath adds. "They taste a lot like wild game and I guess the only thing I can recall eating that resembled the taste was partridge."

Schadt feels that as more people learn the pleasures of eating guinea meat the demand will grow. The business is still in its infancy, "But," adds Schadt, "it's starting to grow up."

MINERAL FEEDING

(Continued from page 59)

Copper and iron are not mentioned as such in the recommended supplement. It frequently happens that a deficiency of these elements causes anemia in young pigs and a pale condition in the combs of poultry. Mineral manufacturers have therefore included these elements in most of the mixtures offered for sale.

Another element which has an important bearing upon animal nutrition in certain parts of the country is cobalt. In some sections of Michigan and along coastal plains this mineral may not be present in sufficient quantity in the feeds and forages to prevent nutritional difficulties. Therefore, many manufacturers include it in the mixture in order to cover these deficient areas.

The manufacturer of commercial mineral mixtures has some problems to consider other than assembling the important mineral ingredients. Stabilizers and binders are important to hold trace materials that might otherwise be lost. Laxatives are used as conditioners, while many concerns also use appetizers to make the mineral feed more palatable. The use of an appetizer, such as molasses, is a matter over which there is considerable controversy. The feeder frequently evaluates a mineral on the basis of its palatability. This really is not a true evaluation because a feed heavily loaded with an appetizer when offered free choice is likely to be consumed in excess of what is needed.

How Much To Feed

How much of a mineral mixture should be included in a ration is another question which many feeders ask. Of course this will depend upon the ration used, the kind of animal to be fed and many other

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conditions. The range, however, will be from practically no minerals except salt up to three per cent in a case where the deficiency is greatest.

Growing pigs in dry lot need from two to three pounds of minerals for each 100 lbs. of feed they consume. If the protein supplement is tankage, milk, or fishmeal, two lbs. of minerals to each 100 lbs. of feed used is sufficient. If the bulk of the protein supplement is in the form of soybean or linseed oil meal then the percentage of minerals in the ration should be raised to three per cent.

Sows during gestation will need about the same mineral treatment as growing pigs. Growing pigs or pregnant sows on pasture can do with less minerals; say one per cent of the grain mixture. Market hogs need two to three per cent minerals for the first three months following birth. The minerals may then be reduced to one or two per cent, depending upon the character of the protein supplement in use.

Minerals may be self-fed, providing the mixture is not loaded with an appetizer. This will cause over-consumption. While the heavy consumption of minerals may do no actual harm, the expense involved is increased without any corresponding return on the money invested in minerals. The presence of an appetizer may be detected by the crowding of animals about a mineral self-feeder.

Minerals should not be fed free choice to animals, until they have become accustomed to the feed. Mineral-starved animals may consume enough to create salt poisoning. This is particularly true of hogs.

In iodine deficient areas one-third ounce of potassium iodide should be added to each 100 lbs. of a home-made mineral mixture.

In case the feeder wishes to combine the mineral with the protein supplement, eight pounds of minerals in each 100 lbs. of supplement is about the correct proportion.

Cattle and Sheep Need Less

The ruminants, those animals with multiple stomachs, need less mineral supplements than hogs. Cattle and sheep having access to good pasture or roughage need little or no minerals other than salt. In the case of dairy cows in heavy milk or of beef cattle which are receiving considerable grain, one to two per cent of the grain ration might be in the form of minerals. In addition, ruminants should have free access to salt.

In the case of poor quality roughage or pasture, cattle and sheep will be benefited by minerals, particularly phosphorus in the form of bone meal. One-eighth pound of bone meal per 1000 lbs. live weight of the animals per day plus free access to salt may well be recommended.

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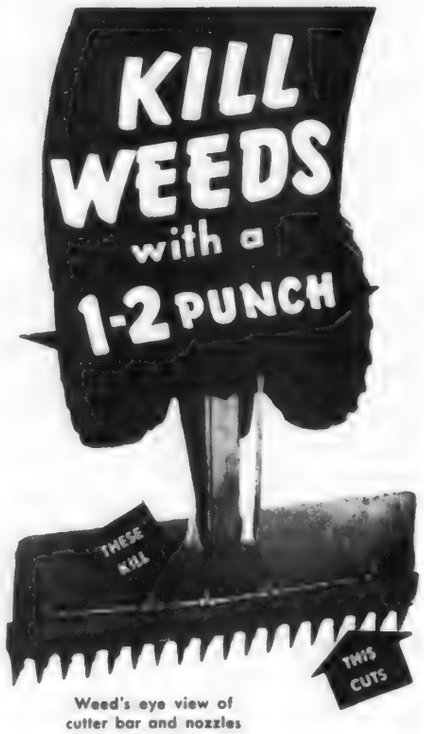

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variation in prices. Some are priced as low as $3.00 per hundred while others are quoted at a figure four or five times this amount. There cannot be this great difference in the actual feeding value of these differently priced minerals. However, some reliable manufacturers have spent large sums in research, which they are justified in passing on in the price of their product. The first question a prospective purchaser of a mineral feed should ask is: "What does it cost?" If the price exceeds $6.00 per hundred, even under present high production costs, the buyer should hesitate before making quantity purchases.

If you are a large feeder it might be economical to buy your own minerals and mix them. This might take some doing because the supply sources are generally widely scattered. A good home-made mineral sufficient to supply the deficiencies in most parts of the country may be composed of the following ingredients and amounts:

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The counter suggestion apparently was of little interest to the salesman because the subject was soon changed. What he knew was that copperas contains both iron and copper and would be just as effective as his manufactured product. He probably knew also that fifty bottles of copperas solution could be made for the price of one bottle of his own concoction. It was obvious therefore why he lost interest in the proposal to make parallel comparisons of the two products.

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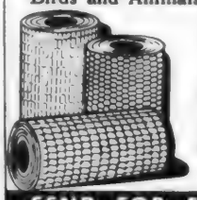

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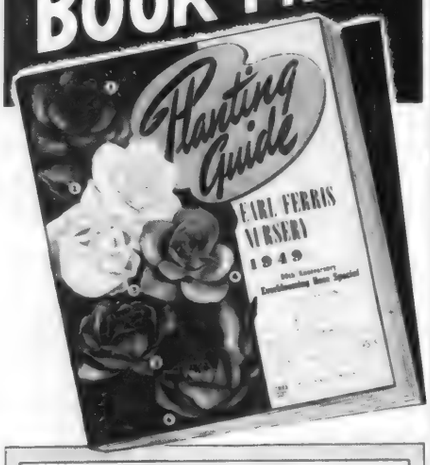

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PAPEC HAMMER MILLS

TALL FESCUE

(Continued from page 65)

Fescue; therefore, this practice serves two valuable purposes.

Livestock will eat the matured leaves, but only under duress. As one farmer said, "You can starve a sheep to eat almost anything. It reminds me of the report made by a man who had acted as a guinea pig to test a new army concentrated food. After three weeks he reported, 'I'm sure that man can live on this food longer than he cares to'."

When it is grown with a legume, such as Ladino clover or Lespedeza, on medium fertile soils, it has a carrying capacity of one to two animal units per acre through the entire grazing season, which in some areas is the entire year.

Critics of Fescue, and there are many and quite as rabid as its enthusiasts, say that this is due primarily to Ladino; that there are certain months when it is so low in palatability that even hungry stock will refuse to eat it. One Kentucky farmer banished it from his farm with the comment, "It looks like bullrushes; it tastes like bullrushes; it is nothing more than an improved bullrush!"

On less productive soils, Tall Fescue is superior to most common grasses in carrying capacity because it is better adapted to soils of medium to low fertility than the common pasture grasses. It is finding a place in the new "winter grazing" program which has swept the South. The drought resistance of Tall Fescue gives it another talking point for Midwestern farmers who have had trouble keeping up their pastures during the long summer dry spells.

Major V. K. Dodge, a Kentucky farmer, is sowing one-third of his 1,200-acre Kentucky Bluegrass farm in Kentucky 31 for year around beef cattle pasture. Major Dodge has had fine pasture for three months in the spring and fall, but with Fescue he expects them to be green and productive the entire year. He will need less grain for his cattle and there will be less labor.

Tall Fescue has not been popular as a hay crop because it becomes coarse and unpalatable as it reaches maturity. However, in the Pacific Coast states, it is being harvested extensively as hay. Hay yields are good, particularly on fertile bottom land where leaf growth is extremely heavy. Stock will eat it and thrive if they can't get anything else. At the Eastern Oregon Experiment Station, Union, Oregon, testing shows Alta Fescue to have the highest average yield over a six-year period of all forage grass commonly grown for this purpose in the state.

Tall Fescue makes excellent grass silage. Undergrazed pasture fields can be kept cut short by harvesting for silage. As silage it has few of the drawbacks of hay, being more palatable and nutritious.

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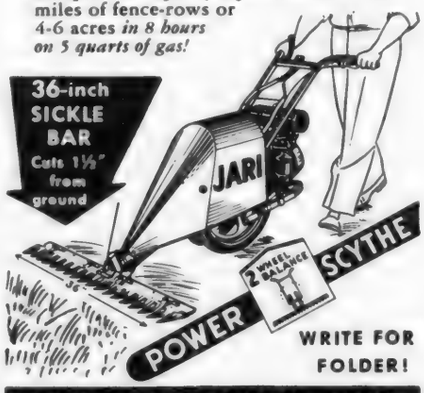

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Shown above is Tip's Chester, an example of the group of fine young halter-broken bulls now being offered for sale by the Norris Cattle Company.

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Add fire resistance to the enduring beauty of *rustproof* aluminum, consider the fact that rats and termites can't get through it, and you have what's best for *your* farm building. Ask your dealer for Reynolds *Lifetime* Aluminum. Write for literature.

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IT IS difficult to pick the best spark plug from outside appearance just as it is to choose the real Hedy Lamarr from the photographs above. But when you install new Auto-Lite Resistor Spark Plugs you can tell the difference in your car or truck.

If you picked the girl at the right as the real Hedy Lamarr, star of United California's "Let's Live A Little" released by Eagle-Lion, score yourself 100%. Her "look-alike" is Mrs. Desirée Weaver of New York City. You'll be 100% right, too, when you switch to the new Auto-Lite Resistor Spark Plug—the plug that gives you the finest in engine performance, the maximum in engine economy.

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★ Because of its low rate of electrode erosion, the new Resistor Spark Plug permits wider initial gap settings and makes these advantages possible.

TUNE IN "SUSPENSE," THE AUTO-LITE RADIO SHOW THURS AYS, 9:00 P.M., E.S.T. ON CBS

"The Tall Fescues seem to recover very quickly from heavy grazing" says William C. Johnstone, Extension Agronomist at the University of Kentucky. "I have known it to be grazed down into dust during late fall but within a few weeks after the moist rainy weather it had recovered sufficiently to provide good grazing in the winter for cattle."

Durable Turf Grass

The toughness of Fescue, its drought resistance and its dense, deep sod, make the grass an ideal cover for airports, playgrounds, athletic fields and other areas where a durable, firm, wear-resistant turf is essential. This is especially true of areas north of the Ohio River.

C. R. Runyon, Superintendent of the Spring Grove Cemetery in Cincinnati and an expert on grasses, says, "Fescue has one property that makes it more valuable than Bluegrass. It doesn't have the summer dormant season that Bluegrass goes through. When Bluegrass becomes dormant during July and August some city fools slop water all over it and all they manage to do is to help the Crabgrass along. Fescue is good at eliminating Crabgrass because it grows under the same conditions and will compete with it." Fescue will stand up under wear better than most any other turf."

The recommended seeding for air strips is a mixture of Tall Fescue with other adapted quick-sod-forming grasses, such as Red top, and Bluegrass seeded at the rate of 50 pounds per acre on landing strips, with half the amount on the remaining area. The Tall Fescue should represent 50 to 75 per cent by weight of such a mixture. On athletic fields and playgrounds a similar mixture is satisfactory, with a seeding of about 150 pounds per acre.

The Conserver

Tall Fescue is being recommended for seeding of waterways, eroding hillsides, gullies, levies, and other areas where a long lived, tenacious, deep-rooted grass is needed. Farmers are seeding Fescue for permanent pasture on fields that are subject to destructive erosion.

Soil conservation districts in the Central and Southeastern states are encouraging rapid seed production so that the seed will be available at more reasonable prices, permitting extensive seeding on land where soil erosion is a big problem.

The progressive, vigorous growth of Tall Fescue is a valuable aid in the control of perennial weeds. This has been demonstrated in Kentucky where wild onion, dock and other pernicious weeds have been greatly reduced after Fescue has been established. Land planted to Fescue at the Oregon Agricultural Experiment Station has been practically eliminated of Canada Thistle, Wild Morning Glory and Quack Grass.

Fescue for Seed

Fescue is ready for harvesting when seeds are released easily as a head is pulled gently between the thumb and forefinger. At this stage of maturity most of the seeds will have reached the hard dough stage and the kernals will have a purplish tinge. Fescue seed shatters easily, which requires the harvesting to be done as quickly as possible after it ripens.

The surest way of saving most of the seed crop is to cut with a binder, curing the bundles in small shocks and threshing as soon as thoroughly cured. It is best to equip the binder with removable pans placed beneath the draper rolls and a box in place of the bundle carrier to catch shattered seed.

The combine can be used successfully on a small acreage if the weather is good during ripening. Some of the large growers start their harvesting with the binder and as soon as the seed begins shattering to the point they can see gold dollars lying on the ground, combines are rushed in to complete the harvesting.

Seed harvested with a combine should be spread out on a tight floor in a well ventilated place and stirred occasionally until dry to prevent sweating and heating. The seed harvesting is done the latter part of June, a little before Orchard grass, Rye grass or Wheat.

Second and third year seed production on medium fertile soils average about 250 pounds per acre. However, yields of 400-600 pounds are not uncommon under favorable conditions. The length of time Fescue plantings may remain in profitable seed

Profit? Yes! A man *should* farm for profit. But in farming, profit is not the entire sum of the compensation. Pride of ownership in fertile, productive fields is part of it. Pride of ownership in a finished herd of pure-breds can be another.

To some farmers also comes the downright pleasure of working their lands with Oliver Tractors. Theirs is the sure knowledge that the world produces nothing finer . . . and thus they portray the keen discrimination which looks beyond a price tag and sees a quality unimpaired by any consideration other than service.

The new fleet of Oliver Tractors appeals so strongly to such farmers that ownership of these tractors is fast becoming a mark of success in farming.

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Confidence that your tires are thus protected against damaging underinflation doubles your driving pleasure. But also don't forget to check tire pressures regularly with your own reliable Schrader Gauge to warn you of possible tire trouble.

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production is variable; usually four or five seed crops can be obtained.

Most of the seed is now produced from solid drilled fields. However, the cultivated row method is gaining in popularity with growers who are planting in rows spaced 30 to 40 inches apart, sowing four to five pounds per acre. The row cultural method has certain advantages in that higher seed yields are usually obtained, cleaner seed is produced, profitable seed production is maintained longer and seed crops can be grown under less favorable conditions than when grown in solid stands.

Fescue for seed production should be planted only on clean land. Weed seeds such as Cheat or Chess, Wild Onion, Quack grass, Dock and Canada Thistle are extremely hard to remove in cleaning and in many cases make the crop unsalable. Other plants that are objectionable are Orchard grass, Tall Oat grass, Rye grass and Meadow Fescue.

In 1947, General E. W. Jones, whose farm is in Huntsville, Alabama, dreamed up an easy way to obtain Fescue seed for planting on his farm. Since his attempts to purchase enough seed prior to harvesting were fertile, he made arrangements with the Arvin brothers, of Penbroke, Kentucky, to *rethrash* the Fescue straw as it was discharged from their combines as they harvested their 300 acres of Kentucky 31. General Jones with two combines salvaged 6000 pounds of clean seed which had a value of approximately $6,000. He took 4000 pounds home with him, leaving the rest for the Arvin brothers as payment for the favor. Having been given a lesson in strategy by the General, the Arvin brothers rethrashed their own straw this year.

Alta or Ky. 31?

On the West Coast Alta has been recommended and preferred by the farmers because of its long period of development and naturalization in this area. Claims have been made that in the West Kentucky 31 was more noticeably injured by stem canker (Rhizoctonia solani) and leaf spot Helminthosporium dictyoides), two of the more serious diseases that are known to attack this grass, than was Alta.

In Kentucky and the South almost exactly the same arguments were used in favor of Kentucky 31 by farmers and agronomists. In that area they claim that they have found Alta to be less resistant to disease.

In other areas it has been found that the two varieties are practically identical from the standpoint of production or usefulness of the grass. In some stages of growth they can be identified but most of the time they are indistinguishable.

Because of the sudden popularity of Kentucky 31, the demand for the seed exceeded the supply and prices went to $1.50 a pound with some seed reported as high as $5.00, as compared with $.40 to $.75 for Alta. These exceptional prices

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- *Easy to use.* Simply insert tip of tube into teat opening and squeeze out entire contents of tube. Ointment moves smoothly into teat—requires no "stripping up" at a later time.
- *Sanitary.* Protected by the tube, the penicillin ointment need never be touched by human hand while being instilled.
- *Large penicillin dose.* Each tube contains 75,000 units of penicillin—an *effective* single dose.
- *Few injections.* 2 tubes are sufficient for most mastitis* cases, since each tube contains 75,000 penicillin units in an ointment base.
- *Economical.* On a basis of units of penicillin, Squibb Penicillin Calcium Ointment *costs considerably less* than most other forms of penicillin. No extra equipment required.

Get Squibb Penicillin Calcium Ointment Veterinary from your druggist *now.* Save in initial cost—and build year-round dairy profits by saving cows and keeping milk production up! Keep at least a half-dozen tubes always on hand! *For accurate diagnosis of mastitis*, call your veterinarian.*

*due to *Streptococcus agalactiae*, the cause of the largest percentage of all mastitis cases.

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"I have a large herd of cows, where udder trouble is always prevalent and this ointment is the best cure that I have been able to find. I have also given a couple of these tubes to some of my farmer friends and they also admit it is tops." *Hope, N. J.*

"When we injected her she was milking between 45-50 and showing much garget. After one treatment she showed considerable improvement, after the second shot she had very little garget and within another 24 hours she was apparently completely cured. Her quarter is a little bit slack but she's milking just under 60." *Pascoag, R. I.*

"We noticed your advertisement and bought 2 tubes of Penicillin Ointment from the Drug Store in Lawrence, Kansas. We followed directions to the letter and believe it was the chronic kind of mastitis. We were amazed after 12 hours to find the swollen quarter normal and the milk from this quarter much better. We then gave another tube and 24 hours later found the milk normal and the swelling gone. After 48 hours we had the milk from each quarter tested by the University of———— lab and found the milk normal." *Lawrence, Kansas.*

"I had two very good cows that had Mastitis in 2 quarters each. Used 800,000 units of penicillin in the crystalline form with no results. Also used a sulfa preparation with no results. Have used 10 tubes of your Calcium Ointment and both cows are now fine and back in full production." *Stafford, N. Y.*

"Penicillin Calcium Ointment is indeed a very good product and is giving us good results in our neighborhood. It sure is a sanitary way of treatment for mastitis, a lot better than a syringe." *Greenwood, Wisc.*

"All in all—everyone likes the ease of application and percentage of efficiency." *Drug Store, Bennington, Kansas.*

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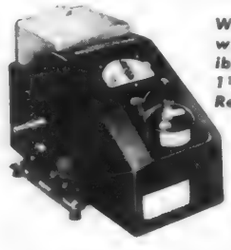

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naturally brought on a seed growing boom in Kentucky and with it an increase in the advertising and enthusiastic publicity for the grass. Reports from certain sections of the country indicate that there has been rather bitter disappointment in the grass. Most of the complaints center around the fact that there was a heavy adulteration, particularly of Rye grass, in the Kentucky 31 seed. In one section of Tennessee, where approximately 4000 acres were planted to Kentucky 31, roughly 75 per cent of the fields averaged 75 per cent Rye grass. Growers in Ohio and other neighboring states have made the same complaint. The fault apparently lies with the growers who did not plant absolutely clean seed. Even a very small amount of Rye grass seed in the original planting will produce a large percentage of Rye grass seed in the harvest. This is simply the nature of Rye grass which is a heavy seed producer. An actual field check showed that Tall Fescue seed with only .43 per cent Rye grass seed planted in October produced a crop the following year which contained 23.3 per cent Rye grass seed. To add to the difficulty the Rye grass seed is almost exactly the same size as Fescue seed and very hard to separate from it in cleaning.

Disgruntled farmers who have had a bad experience with the seed say that even the certified seed is not clean and that they are hesitant about taking the recommendations of some county agents who are reported to be growing Fescue seed to sell.

In the general farm pasture program Tall Fescue falls somewhere between the extreme claimed for it as a "wonder grass" and the notion of its opponents that it is little more than a tamed bullrush. In some sections it can be almost a year-around grass with wide tolerance for both wet and dry land; its deep, thick root system helps control erosion and adds tilth and humus to the soil. It makes a strong comeback after close grazing. It does well on poor land and persists for years without reseeding. It does best when planted in a mixture with a legume.

Its shortcomings are no more numerous, when weighed against its virtues, than those of any other grass. It is low in protein; it is unpalatable when fully matured; it makes poor hay; it is easily fouled by Rye and other grasses, and clean seed is hard to get. It has been over-promoted and, until recently, has been priced too high.

Behind the sound and fury of the critics and the supporters of Fescue it appears that it has some virtues other grasses have not and some faults that other grasses lack. It is only one means to the end of developing good pastures

CORN BORER

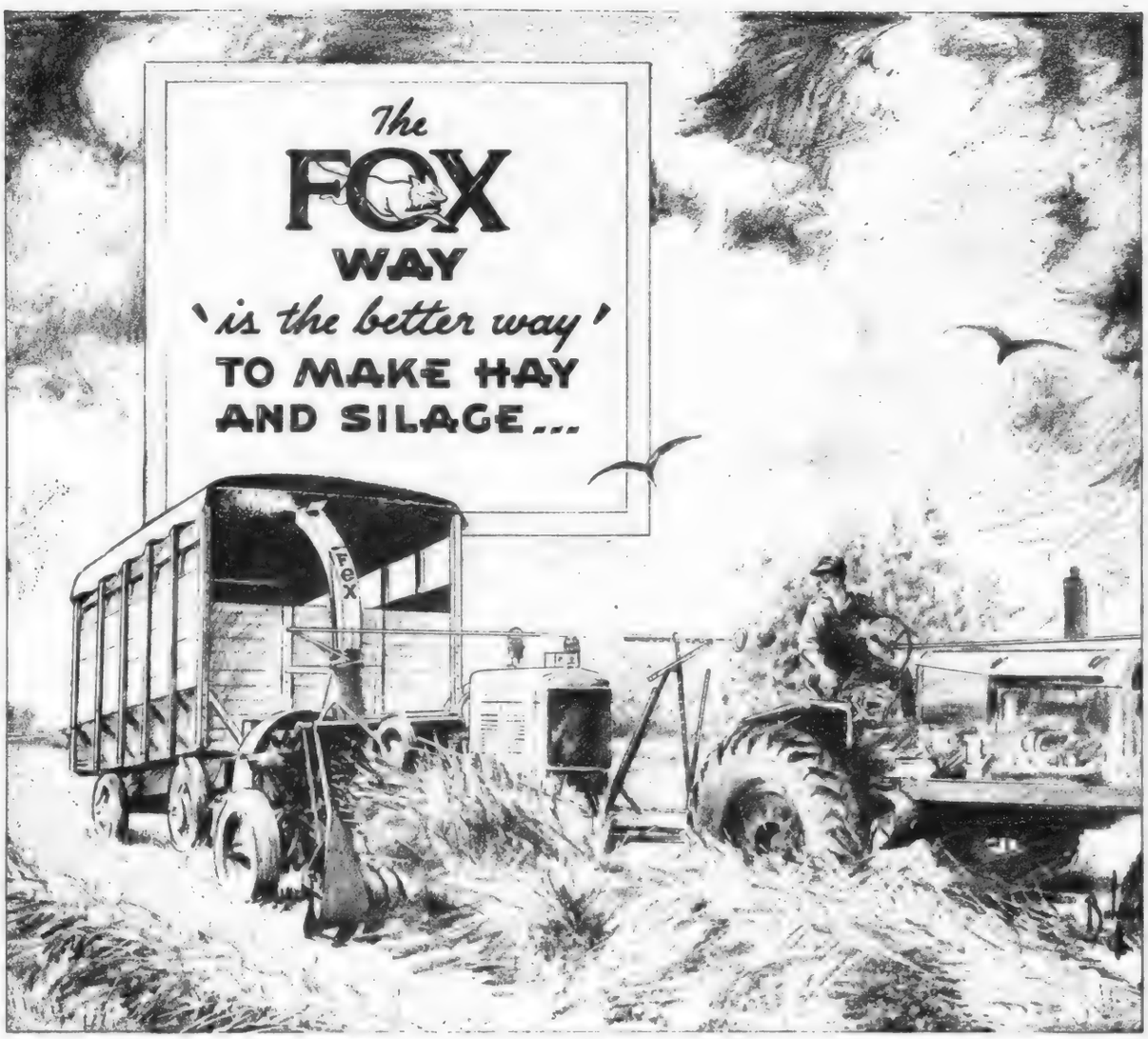
(Continued from page 81)

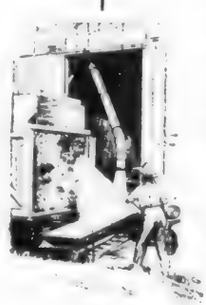
Farmers should make certain that stalks are buried deep enough, if possible to a depth of four to six inches, so that they won't be dragged to the surface in discing, seeding, or other field operations.

Fall plowing is preferred, but spring plowing is satisfactory if completed before the last week in May. The earlier it is done the more effective it will be.

Hand-picked corn fields can be plowed in either direction without previous discing or leveling. In machine-picked fields, if the stalks are left standing, it is best that plowing be done in the same direction as the picker was driven. Double discing a machine-picked field before plowing will help to cover the stalks better. When corn is to be shredded off the field or put into a silo, low cutting is a wise practice. The closer to the ground the corn is cut the fewer borers there will be left in the field.

A moldboard plow with a 14 or 16-inch bottom covers trash and stalks as well as any implement in use today. A large 16 to 18-inch rolling coulter, either smooth or notched, helps materially to cut trash and prevent clogging. Jointers of either the moldboard or disc type are essential to secure good coverage. Two or three No. 8 or No. 9 pieces of wire, 12 to 15 feet long, one fastened to the coulter shank and the others to the front of the plow so that they will drag in the furrow, are very helpful. They hold the trash down and roll it into the bottom of the furrow as





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the furrow slice is being turned. If the field isn't very trashy, one wire will do the job. Whatever the equipment, the point is that it must cover the stalks completely.

Discing corn stubble before planting small grains, a common practice in some areas, will not destroy the borers within the stubble. If winter grains must be sown on unplowed corn land then the corn should be cut close to the ground and ensiled, shredded or fed to livestock in a small yard in such a way that what is not eaten will be thoroughly trampled. Cornstalks that haven't been completely trampled in the yard by spring ought to be taken out and plowed under.

Where the borer has been present for several years most farmers accept clean plowing and destruction of corn stalks and other host plants, before moths can emerge in the spring, as a matter of course. Until farmers of newly infested areas unanimously adopt such tactics, however, they will all suffer from the borer.

Resistant Hybrids

An attachment which shreds the stalks as the corn is picked is now being made. It is easily attached to the picker and not only destroys the winter quarters of the borer but reduces stalks to a mulch that serves as a good winter cover. Recent models of pickers come equipped with a shredder. Shredded stalks work into the soil easier and decay faster.

There are other reasons why long-infested areas usually have less borer trouble. One is the differences in corn with respect to its borer "resistance." That some strains of corn are only lightly damaged has been shown by tests carried on for years by corn breeders in Ohio. The differences appear as variations in (1) the attractiveness of the corn plant to the moth of the borer; (2) the ability of the borers to establish themselves in the plant and survive there; and (3) the ability of the plant, even though infested, to produce a good yield of corn.

The Ohio Seed Improvement Association lists the resistance and tolerance to corn borers of all the main hybrids used in the state. Farmers in other states may find that strains of borer-resistant corn well suited to Ohio may not do well for them.

Some progress is being made in Minnesota, Illinois, Wisconsin and Iowa in developing a borer-resistant hybrid corn especially adapted to local conditions. Farmers should consult with their county agents for best results in selecting corn that is both borer resistant and adapted to their territory.

Timely Planting

In areas where it is possible, late planting serves as a deterrent to the European corn borer. For example, Ohio's state Entomologist, T. H. Parks, says: "In this state early planted corn is sure to get infested with borers of the first generation, which produce a second generation that injure the late planted corn. We have about two weeks of 'best planting time' that is safe to follow. The time at Columbus, Ohio, for example is between May 15 and 29. We discourage planting before and after those dates unless wet weather makes it necessary to plant at the later date.

"Because of a wet spring about half of the corn was planted after May 29 in northern Ohio in 1947. Much of it did not mature, but since there was no early corn in the state, very little of the late corn became infested."

Similar observations have been made in Illinois, Indiana, Iowa, and elsewhere where the growing season is long enough to permit a choice of planting dates.

Farmers should consult with their county agents or follow the recommendations of their state entomologists to take advantage of the best planting dates for their locality.

Bug Eat Bug

European corn borer parasites also have a certain effectiveness. Swarms of certain species of wasps and flies have been released in the corn belt in recent years by state and federal entomologists. They lay eggs on corn borers or within their bodies and the eggs hatch into maggots that do an even more thorough job of draining the life out of Mr. Corn Borer than he does on the corn plant. Augustus De Morgan expressed the idea in, "Big fleas have little

fleas upon their backs to bite 'em. And little fleas have lesser fleas, and so on ad infinitum."

The most recent of the corn borer parasites was brought from the Orient on the last Pan-American clipper to cross the Pacific in 1941.

The drawback with parasites is that it usually takes from four to five years to build up their population to a point where they will effectively reduce borer numbers. In the New England states, where parasites have been operating for several years, as high as 35 to 40 per cent of each year's corn borers are found to be infested with them, a piece of happy news for the yankees up that way.

Dr. J. J. Davis of Purdue University introduced a parasite with the elegant name of Lydella into some Indiana corn fields four years ago and a check in 1948 showed as high as 35 per cent parasitism. Ontario, Canada, not generally regarded as a corn province, has had great success with parasites. A curious Hoosier farmer, Jim Fitch of Delaware County, went up to Canada to see for himself. "I never saw anything like the way those little bugs go after those corn borers. They eat them right up," he said.

In July of this year the Illinois Natural History Survey released 20 colonies of parasitic wasps in Hancock County for a trial run against the borer. The wasp, Macrocentrus gifuensis has been successful in Eastern states. The survey first released a parasitic fly in 1944 in Illinois and reports helpful results. Dr. George C. Decker, the Survey entomologist, says parasites can never achieve complete control alone but must be regarded as part of a whole control combination which has as its corner stone effective cultural practices.

Insecticides

If the borer appears in an area where farmers haven't yet established control practices on a general scale, where hybrids haven't been developed and parasites aren't yet common, it is often necessary to use insecticides to control the rascal. Only occasionally, and then usually on sweet corn, are insecticides used in areas where the borer has lived for several years and other controls contribute to the reduction of his numbers.

DDT and Ryania sprays and dusts can be applied for $3.50 to $5.00 an acre on a custom basis. And if a farmer uses his own equipment this cost may be reduced. Correctly timed, insecticide applications have saved from five to fifteen bushels per acre in heavily infested fields.

"Last year my yield was down 15 bushels to the acre," says John Atvold, who lives three miles south of Rochester, Minnesota. "I didn't spray for the borer last year and it cost me over $30.00 per acre in lower yields. This year I sprayed my field with DDT emulsion. I rented the equipment for my tractor for $15.00 from a neighbor and I went over my 30 acre

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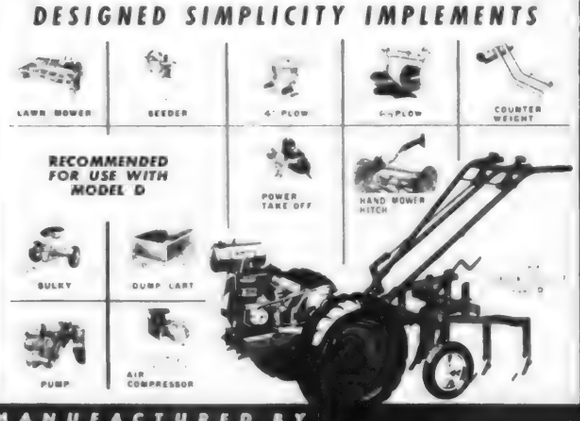

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cornfield. It cost me about $3.00 to $4.00 to spray an acre, but it sure did a job on those borers. My corn looks good this year. Just about every stalk will have a good ear and even though corn prices are going down, I'll get a good return on my investment. I'm going to have my own spraying outfit next year."

The most important thing in the chemical control of borers is timing. Young corn borer caterpillars are most susceptible to insecticides just after they have hatched and before they have gone into the leaf whorl or into the stalks. Once inside, they are relatively safe from insecticides.

For best control there should be a layer of insecticide on the leaves while the eggs are hatching and before the caterpillars reach the protective leaf sheath. It is not necessary to direct the spray or dust to the underside of the leaves.

Farmers should start checking for the white egg masses when the corn is from 15 to 18 inches high (normal, not extended leaf height). State entomologists, county agents and other officials usually watch the situation as hatching time nears and will make recommendations, but it would be well if the farmer learned to observe the egg masses for himself.

Jake Kucera who farms 200 acres of rolling Iowa countryside a few miles west of Cedar Rapids, says: "A fellow sure does have to look sharp, for borer eggs laid on the underside of corn leaf don't make a spot bigger than a good sized freckle. But if you miss 'em then and the borers get into your corn, you've got trouble. Two years ago I lost 10 bushels to the acre because of the borer. If I'd been watching sharp for those eggs I could have had the corn dusted or sprayed for less than a third of the loss I took on the corn."

Spray or dust should be applied if there are 50 egg masses per 100 plants (25 for sweet corn) at the beginning of the first generation egg-laying period. The application should be made when the dark spots begin to appear on the eggs.

One or two applications are made on field corn and from one to four on sweet corn and hybrid seed corn. The added applications for sweet corn may be required because more complete control is necessary if the corn is to be canned for market.

The number of applications depends on the period of time over which the egg-laying and hatching are spread. The weather greatly influences the amount of time these operations take. When minimum temperatures fall below 60 and 65 degrees at night, moth activity is restricted. Hot, dry weather will not favor the emergence of moths from their pupa cases, nor the hatching of eggs.

If laying and hatching extend over a short period of time, say from 10 to 18 days, a single application may do the trick and so restrict the numbers of first-generation borers that the second generation won't be large. But if egg hatching and laying extend over several weeks, as they did in southern Minnesota in 1948, more than one treatment may prove necessary.

Growth of new leaves and the effect of weather and sun reduce the effectiveness of DDT and may make new applications necessary at approximately weekly intervals. Again, it would be wise to follow the advice of county agents and other experts.

DDT and Ryania are the best and most economical insecticides we have so far for corn borer control. They can be applied either as dusts or as sprays. The various applications include:

(1) Five per cent DDT dust. This is the simplest to apply and the most widely used insecticide. Thirty-five pounds per acre should be used per application.

(2) Thirty-seven per cent Ryania. Apply 10 pounds per acre.

(3) Twenty-five per cent DDT emulsion. Apply two quarts per acre. Dilute this DDT emulsion with water. The amount of water used will depend on the capacity of the sprayer. If a low-gallonage weed sprayer is used, regulate it to put out as much water as possible up to 50 or 75 gallons per acre. If the 25 per cent DDT emulsion is to be applied with a converted weed sprayer, be sure to get assurance from the dealer that the solvent used in the emulsion is non-toxic and will not injure plants if applied in strengths over five per cent.

(4) Fifty per cent DDT wettable powder. Apply three pounds per 100 gallons of water per acre for best results. Using this diluted

spray at about 100 pounds per square inch of pressure has proved the most satisfactory way to apply it. Wettable powders should be used in sprayers that have agitation devices to keep it well mixed and prevent clogging.

(5) Pure ground Ryania. Apply four pounds per 100 gallons of water per acre.

Generally speaking, ground spray machines give best results. Ground dusters rank second and airplanes third for applying insecticides. However, the differences aren't so great that the most readily available equipment shouldn't be used when needed.

Spray machines for corn borer control should have a boom with two or three solid cone nozzles per row. Adjust these so that a drenching application can be made on the upper, leafy part of the plant.

Row crop sprayers, developing pressures from 35 to 100 pounds per square inch, give the best results because they drive the spray into crevices where the borer likes to hide.

Low gallonage weed sprayers can be used in corn borer control by replacing the boom with nozzles arranged for row-crop spraying, and using cone-shaped nozzles that give a coarse spray. Twenty-five per cent DDT emulsion works best in this low-gallonage type of sprayer.

Crop dusters, especially row-crop dusters, can be easily adapted with two dust nozzles per row to cover corn plants thoroughly. The machine should have a gauge so that the dust output of the apparatus can be adjusted. Tractor-drawn or mounted dusting and spraying machinery can be used up to the time the corn is 30 to 35 inches high. This equipment ordinarly will not break down the corn, especially if applications are made on a warm evening. Some hybrid seed corn growers have made excellent spraying attachments for their tasseling rigs.

Airplanes are more effective where large areas have to be covered in a short time, or during wet seasons. They are also effective for late August applications to control the second-generation borer since they will get over the field without damaging the corn. It doesn't usually pay to use insecticides on second-generation borers in field corn unless the count in the middle or latter part of July reaches 100 egg masses per 100 plants.

Commercial sweet corn growers have suffered tremendous losses from second-generation borers and they frequently find it advisable to use insecticides to control them. Second generation moths, upon emerging and mating, do not look for the most mature corn on which to deposit their eggs, as did the first generation moths. Instead, they look for the shorter, more succulent corn, which most generally means sweet corn, if it can be found.

From the middle of July until harvest time, sweet corn producers should be checking fields for corn borer eggs and should make applications of insecticides when the count approaches 25 egg masses per 100 stalks. Applications should be repeated at weekly intervals as long as sufficient numbers of fresh eggs are being deposited on the plants. Because of the abundant, succulent growth, the entire sweet corn plant should be examined carefully for eggs. Flags on the ear husks should also be checked, for they are but a short distance from the ear and if the borer gets into the ear he ruins it for canning.

Sweet corn should not be treated in the week or ten days prior to canning. Similarly, farmers ought not feed DDT treated corn to their livestock right after treatment, but should wait a week or more until the DDT, which has limited toxicity, has "worn off" the plant.

Most scientists say that if farmers in an infested area would cooperate in cultural control, insecticides would not be necessary or at least need be used only as an adjunct. However, the probability of getting 100 per cent cooperation is so remote that insecticides are assuming great importance.

For complete control, and eventual elimination of the corn borer, a combination of all methods, plus complete cooperation among farmers, will be necessary.

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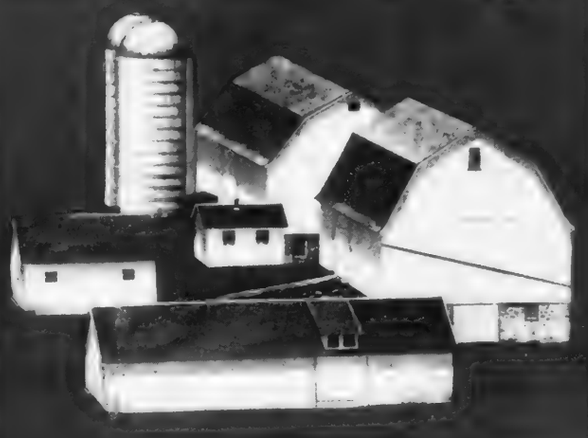

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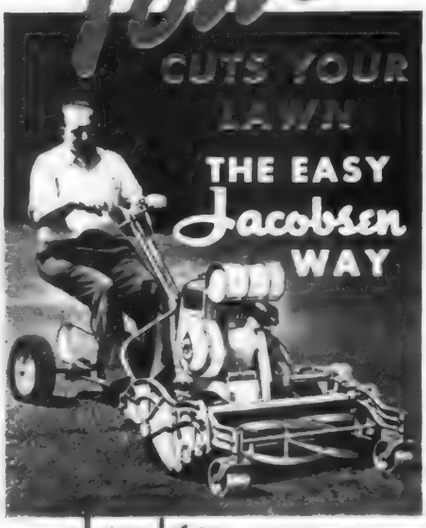

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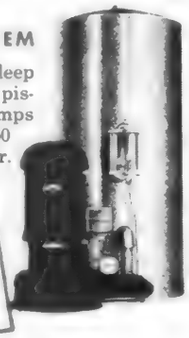

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(Continued from page 43)

on the following daily ration:

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50 pounds of molasses to which urea has been added. Actually, it is 45 pounds of molasses and 5 pounds of urea. Because both cost $80 a ton—4c a pound $2.00

50 pounds of bright baled alfalfa at $30 per ton or 1½c a pound.....$ .75

300 pounds of ground corncobs which were figured at $4.00 per ton, or a fifth of a cent per pound.....$ .60

TOTAL COST OF FEEDING 19 HEAD PER DAY $5.35

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The cattle were weighed every two weeks and gained at the rate of a pound and three-quarters a day. That makes a cost per pound of gain of 16c. Garst and Thomas estimate this as less than one-half the average cost per pound of gain where cattle are being fed a normal ration of corn, protein and hay.

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The method of feeding is exceedingly simple and could be easily followed by any farmer. The dry ground corncobs and the dry soybean oil meal and linseed meal are simply placed in the feed bunk. Then the fifty pounds of molasses and urea are diluted with about an equal amount—fifty pounds—of water to remove the stickiness and this thin syrup is poured on the feed in the bunk and stirred with a hoe. The cattle are only fed this ration once a day—in the morning.

In the evening they are fed fifty pounds of good bright, alfalfa hay in the feed bunk on top of the remaining cobs and they clean up the alfalfa hay and the remaining cobs during the night. If the bunk is perfectly clean a few extra cobs are added the next day—if some remains the number of cobs are reduced somewhat —the other feed being held constant.

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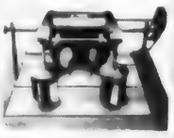

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Average Daily Ration	Pounds
Ground corn or hominy feed	8.2
Oat mill feed	3.0
Molasses	.5
Cottonseed meal	.8
Linseed meal	.8
Corn silage	12.4
Alfalfa hay	1.6

Salt, self-fed.

How Much Protein

Dr. Wise Burroughs and Paul Gerlaugh explored the question of upping protein feeding in 1948 experiments to see what effect giving the bacteria in the rumen extra food would have. When they increased the protein content of the ration from 8 to 16 per cent they got an increase of 20 per cent in digestibility of both the timothy hay and corn cob meal part of the ration. Using these and other tests as a basis for their recommendation, they say that in feeding grain and roughage rations the cattle should have at least 10 to 12 per cent protein for most efficient utilization of fibrous materials. In feeding urea as part of the protein requirements they point out that it should not make up more than one-fourth of the total protein requirements or 1% of the total ration. For practical purposes this will mean that your urea ration per day will not run over two to four ounces per animal, since urea has a "protein equivalent" of about 250 per cent. Four ounces of urea, when fed along with other farm grains, will be built into approximately the same amount of protein as 1½ pounds of soybean meal. Four ounces of urea costs about 1c at the present market —1½ pounds of soybean meal costs 6c.

As we find out more about feeding roughage we should be able to get our costs down. Scientists think that such research work as looking into Chris' rumen is paying off.

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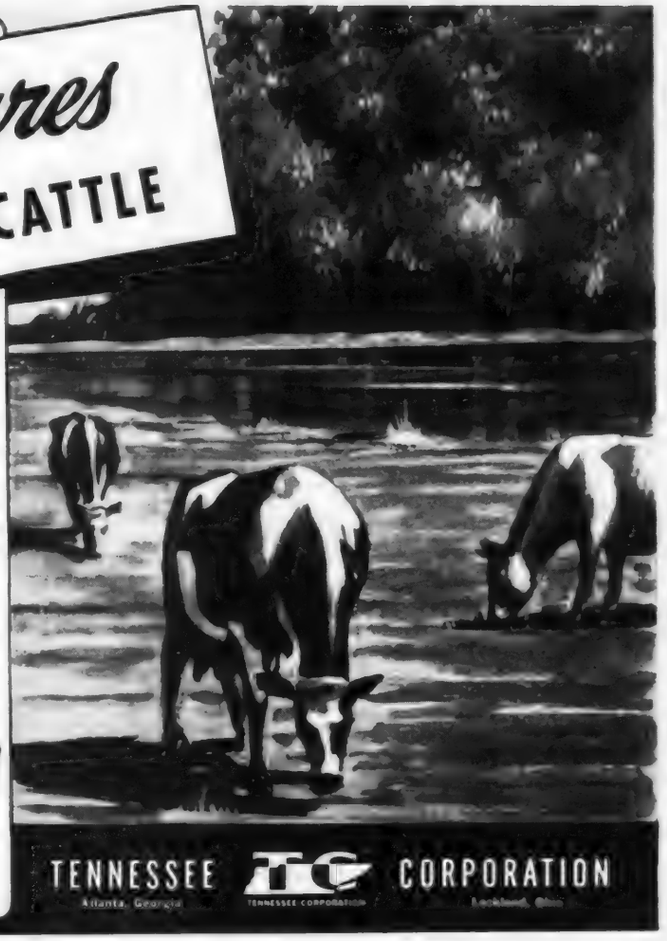

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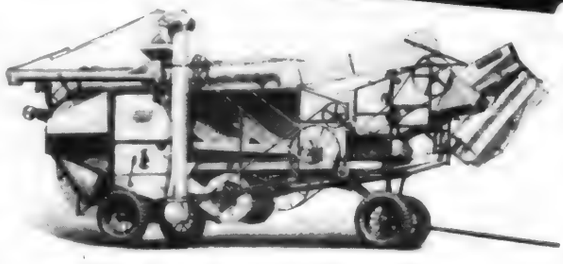

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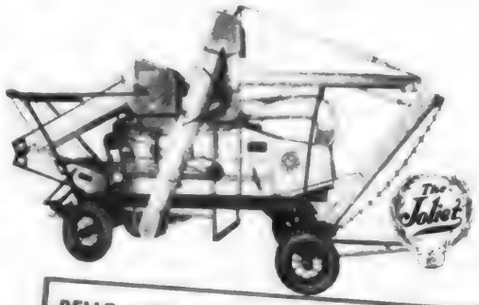

The present demand for Belle City implements exceeds the supply, but Belle City dealers will do their best to serve you.

BELLE CITY also builds Corn Pickers, Castor Bean Hullers and Grain Elevators.

Belle City MANUFACTURING COMPANY, Racine, Wisconsin

KENTUCKY WAY WITH LAMBS

(Continued from page 49)

growth of wool may appear to be in better condition than they are in reality. The only way to be sure is to feel their backs. Any ewes not gaining properly should be pulled out and fed according to their needs.

The first lambs may be expected a few days short of 21 weeks from the time the rams were turned with the ewes. When ewes appear to be on the eve of lambing they should be penned off in a section of the barn where there is plenty of room for them to move about without mashing their new-born lambs. On Stephenson's farm expectant mothers are taken to another barn, which is near the house. Here it is more convenient to give them the close attention they need.

Practically every flock contains ewes that will need help at lambing time. Large ewes bred to rams of a smaller breed have less trouble at lambing time. Condition is also a factor. The herdsman should help the ewe only after it becomes apparent that the ewe will not be able to make delivery without help. See that fingernails are cut short, and hand and arm washed in warm water with soap. If there are any abrasions on hand or arm use a rubber glove. The first step is to determine with the hand, whether the lamb is in right position for delivery—head and two front legs forward. Lambs in an abnormal position, except for lambs coming backward which can be delivered that way, should be pushed back and brought forward in a normal position before delivery is made. The attendant can then help the ewe by pulling in a downward direction on the lamb's legs as the ewe strains.

The job isn't finished when the lamb is born. The "midwife" should see that the ewe owns her lamb and nurses it. Most ewes disown their lambs because they have been poorly fed or have had difficulty in lambing. Often a ewe slow to own her lamb will take it if she is held several times while it nurses. If this fails other methods should be tried. One of the best is to put the ewe in a sheep crate where she can't resist and remove one or two of the lower boards on one side to give the lamb room to nurse.

Stephenson has almost eliminated this problem in his flock because the ewes are brought to lambing in a vigorous condition and gaining in flesh, though not fat. Their lambs come strong and the ewes have plenty of milk for them from the start. "We do have a little trouble," he said, "in the case of twin lambs where sometimes a ewe will own the last lamb but not the first." In such cases both lambs are taken away from her and put in some close place, such as a barrel, where they have bodily contact. When handled in this way, they smell alike when taken back to the ewe even though she has licked the first one dry. Some lambs are too weak at birth to nurse without help. In such cases,

put a teat in the lamb's mouth and squeeze milk into it until it gets a taste and begins to help itself.

Lambing pens, which more appropriately could be called mothering-up pens, are essential equipment at lambing time. The pens are made with 3′ x 4′ moveable panels which are stored, from year to year, and put up and taken down as needed. Two of these hinged together are thrown across a corner to form a pen four feet square. After a ewe lambs, she and her lamb or lambs are put in a pen that has been freshly bedded where, except in an abnormal case, they will remain for only a day or two.

While the umbilical cord is still wet after birth it should be dipped in tincture of iodine to prevent joint-ill. Among other jobs, and one that should never be overlooked, is to see that the lamb nurses from both sides of the udder. It is here, also, that the lamb is marked with the same body number as its mother, so it can be readily identified, at any time, after it leaves the lambing pen.

"Every ewe that gives milk must raise at least one lamb," says Doc. "If she loses her own she is given a lamb of a ewe that died or has more than one." The time honored method of fastening the pelt of the dead lamb on the one to be adopted is seldom used. Instead the lamb to be adopted is rubbed over the dead lamb or in the afterbirth. Some sheepmen have found it helpful, also, to tie the lamb's legs and leave it in front of the ewe for a half hour or so. Usually she will lick it dry and will claim it as her own when the cord is cut and it gets up.

All lambs are docked and the ram lambs are castrated at a week or two of age. Doc uses an emasculatome for castrating. The tails, also, are "clamped" with this instrument and removed with a knife. Many farmers still use a knife or shears for both operations, but have never been quite satisfied with this method. There is always the danger of infection, even when the operations are performed under ideal weather conditions and all sanitary precautions taken.

A new "tool" called the "Elastrator," invented by a New Zealander and introduced to this country by Dr. J. F. Wilson, of the University of California, may be the solution. This instrument has already caught on in the west and tests with it in many Kentucky flocks last season brought only praise from those who used it. With this instrument especially designed rubber bands are applied to the tail and scrotum. These appendages drop off with the bands in about three weeks. When used for docking late lambs, when flies are around, cut off the tail close to the ring with a knife or shears, but leave the ring on. It will fall off later. In such cases use a good fly repellant, such as pine tar oil.

Lambs should run to a creep from the time they will eat until plenty of spring grazing is available. Here they should get

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- Average up to 25% more profit the easy, inexpensive Clipper way! Science proves cleaned and treated seed always produces a stronger stand . . . a richer harvest!
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4 models, from 5 to 12½ H.P., 68 in. wheelbase, 36 in. wide, 24 in. plant clearance. Hand or electric starter. Improved steering device, brakes enclosed in differential housing shaft. Heavier frame and bearings. Standard hitch for trailers and wagons. Plow, harrow, cultivator, cutter bar, snow plow, bulldozer available.

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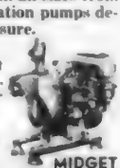
The MIDGET 1½" pump – weight 60 pounds. Pumps 3500 GPH . . . . Self-primes to 30 feet . . . . non-clogging trouble-free.



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the same grain mixture given the ewes and good leafy legume hay. Corn, as the only grain, has been used with good results.

The flock is normally entirely off feed by April 1, and the lambs are finished on pasture alone. Rye which has furnished much late winter and early spring grazing gives way to bluegrass and volunteer white clover. As the season progresses and the bluegrass gets coarse, lespedeza takes over to finish the job. A 5-acre field of ladino, however, has so impressed Stephenson that the acreage of this clover is being increased. He expects this to play a major role in both his sheep and cattle operations.

The lambs are sent to market as they finish but never under 80 pounds. In selecting lambs for market each lamb is weighed individually at the farm. Only those that make the grade in weight and finish are sold. The others go later.

Where Sheep?

Some sheepmen would tell us that every farm should have its flock of sheep. This is a long way from the truth for there are numerous farms on which sheep have no place. However, there are hundreds of farms that now have no sheep and could, with a carefully selected, well-managed flock, put to work a lot of feed that is now going to waste. Sheep would fit hand in glove with a soil conserving type of farming and at the same time return a handsome profit on the money and labor spent on the project.

Before a sheepless farmer starts out with the truck to bring back a load of ewes, however, he would do well to study up on the subject. He should know what size flock his farm will support, what breed he should raise. A half hour spent with the county agricultural agent will help him fit his flock to his farm. Old sheep men in the neighborhood too, can offer money saving advice.

While there is much truth in the old adage that "the smaller the flock the better the sheep do" many flocks are too small for efficient operation. A flock of 25 to 35 ewes, for instance, is a more efficient unit than a smaller flock which would require the same cost for ram service and nearly as much labor. Naturally, of course, the available pasture, feed, shelter and fencing are matters to be considered in determining the size of the flock.

The flock should consist of grade or crossbred ewes of high lamb and wool producing ability and good purebred rams of one of the early maturing mutton breeds. While healthy, well-grown native ewes in good breeding condition are satisfactory, there is no dependable supply of them. Anyway, westerns of the better types are generally more profitable. They are hardier, longer lived and earlier breeders than most natives, usually shear more wool and come in comparatively free of internal parasites.

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WITH THE POWERFUL
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Nationally known Dairy and Health Authorities say: Clipping prevents dirt accumulation—the chief source of sediment in milk. Clipped cows are easier to keep clean, take less time—produce milk with lower bacteria count and less sediment—it is more desirable milk, brings more money. For best clipping results use Clipmaster. Powerful, air-cooled, smooth-running motor inside the Easy-grip handle. Can also be used for clipping horses, mules, dogs, etc. $32.50. (Denver and West, $32.75.)

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WHITE LEGHORNS
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NINE FIRST PLACES
1948 OFFICIAL LAYING CONTESTS

You can truly be proud of your poultry flock when your foundation stock comes from Kauder's. Over many years the Kauder strains have proven themselves unequalled in official laying tests for production, livability, and old hen production. Here are a few of their official records:

1948—Penna.—High N. H. Pen.
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In 14 Years at Storrs—Highest Leghorn Average.
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The Kauder Strains are bred according to one of the most advanced and modern breeding programs in the U.S., combining inherited qualities into chicks that consequently have higher profit and foundation breeding value. Write today for our big new catalog with the complete story of these famous strains.

IRVING KAUDER
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In Kentucky the producers depend mainly on western ewes of the blackface type, mostly Hampshire crosses. For many years these were brought in from the west only as yearlings, more recently as lambs as well. These lambs which are received in the fall are roughed through, mainly by farmers who have no other sheep enterprise, for sale to the lamb producers the next summer as yearling ewes. Most of them are handled in flocks of several hundred to a thousand head, and more in some instances.

Among the larger operators who, for years, have made a business of growing out western lambs for sale to their neighbors as yearlings is Luther Rice of Bourbon County, the first man to bring such lambs to central Kentucky, and F. W. Clay of Clark County. These men normally run about two thousand head each, but like the smaller operators they depend on pasture with a limited amount of hay during the winter. The winter and early spring grazing is small grain, or bluegrass that was allowed to make good growth during the fall. This lamb plan has worked out so well that with the growing scarcity of blackface yearlings in the West it may soon become the principal means of getting blackface western ewes for our farm flocks. This plan has already supplied some 400,000 ewes for Kentucky lamb producing flocks.

The fact that most Kentucky sheepmen are partial to the blackfaces, because when bred to Southdown rams they produce lambs of the type the trade expects from Kentucky, does not mean that they are best for all conditions and purposes. Various types of range ewes, cross breds and those strong in finewool blood have certain qualities which endear them to farmers. Most of these types are hardier, longer lived and earlier breeders than the blackfaces and some just as prolific, although in general their lambs are a little slower finishing and are not quite so compact and low set as those out of the blackfaces. Local conditions as to seasons, time of breeding and markets, together with the likes and dislikes of the individual farmer are some of the factors that should be considered in determining the kind of ewes to buy as well as the breed of ram.

Under the Kentucky system of lamb production most sheepmen sell all their ewe lambs as "fats" and when replacements are needed purchase yearling ewes for the purpose. However, some Kentucky farmers and many in other states maintain their flock number by holding back ewe lambs for replacements. Where such is the plan ewes strong in finewool blood should be used as the foundation. The use of a Hampshire or Suffolk ram on such ewes produces a cross similar to westerns of the blackface type. The Dorset ram has a place here also. In a five-year test at the Kentucky Station before the war ewes sired by a Dorset ram and out of Texas finewool ewes raised an average of 1.7 lambs per ewe.

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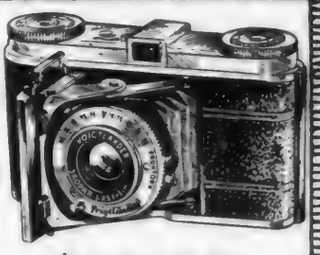

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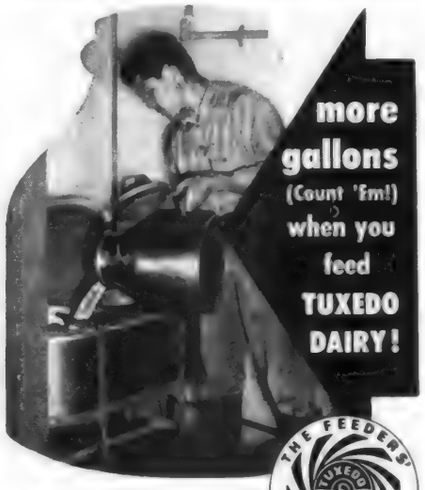

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Cincinnati, Ohio *Established 1881*

TUXEDO *Dairy*

BUY WITH CONFIDENCE — FEED WITH PRIDE

The cost of rams and ewes varies from year to year depending on the demand and supply and the price of lambs and wool. Normally a choice 85-pound lamb will bring nearly enough in June to purchase a western yearling ewe in July, and four such lambs will generally buy a good yearling ram.

For the long pull, opportunities in sheep production appear as favorable as any other livestock enterprise. Breeding ewes on farms and ranches of this country are the fewest in 82 years, and the average age of the ewes is the highest on record. This means that lambs will be in short supply for many years. Wool, also, while it normally accounts for less than 25 per cent of the income from early lamb producing flocks, is in the best position for many years.

HOT STUFF

(Continued from page 54)

everything from the amount of sunshine it absorbs in growing to whether it is ground with or without stems and seed; from the amount of it used to the length of time and the temperature at which the food is cooked. Local preferences made it impossible for Brockman to sell his firm's product, all of which came from California. Brockman decided if someone could supply Arizona and its neighbors with the right kind of chili he'd make some money. The idea launched him on a tasting tour of the country. He covered his whole territory and most of the rest of the country like a heat wave, sampling chili and asking questions. Before he was through he knew every chili preference, not only in the Southwest, but in the nation, and he knew every chili plant by its first name. The favorite pepper in Mexico is the Anaheim; California won't admit this, but the reason the Anaheim pepper grows dark red in California and very bright red in southern Arizona is a matter of summer sunshine. The Arizona summer supplies not only a lot of sunshine, but of such intensity that it dries off summer showers like a blotter takes up ink, with the result there is no mold in the crop.

Brockman also met personally and took quite a fancy to a chili pepper which had gone to college. It is the pride and joy of the New Mexico College of Agriculture and Mechanical Arts, just outside Las Cruces, where it was developed. It is known affectionately as College Number Nine. Its job, for which it is eminently qualified, is to produce a real Spanish-American accent in food. Its devoutees say it is hotter than the hinges of hell.

Once he had selected his two varieties, Anaheim and College Number Nine, Brockman set out to find the best possible place to grow them. This turned out to be a good deal easier than convincing local farmers they ought to plant them. When he found that the reddest of all chili pep-

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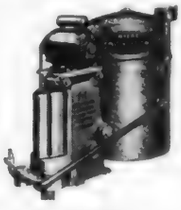

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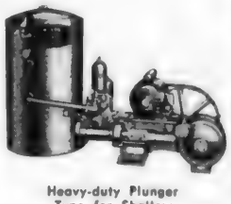

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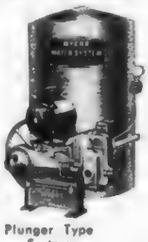

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pers came from near Elfrida in the Sulpher Springs Valley of southeastern Arizona, he started a chain reaction which hasn't yet ended.

Elfrida was a sleepy little desert town minding its own business, which wasn't much, when Brockman put the finger on

Stewart L. Brockman, the Chili King

it in 1937. It was surrounded by small subsistence farms and it was a rare family indeed that saw more than a hundred dollars cash a year. The farmers lived from their gardens, made their own clothes and did without everything requiring cash.

But the soil was good; it produced the reddest chili peppers Brockman had ever seen. There is frost in winter, but no danger of it after May. There is sunshine all summer long, but because of the elevation (4400 feet), not too much heat. The area has one of the best underground water supplies in the Southwest—there's so much that nearby mines are flooded. And Douglas, a good-sized city by Arizona standards, is only 25 miles away and on the Mexican border. This meant a good labor supply for the planting season in May, and for harvesting, which starts in September for ripe chili, in mid-August for green. They say in the Southwest that only God or a Mexican can tell when a canteloupe is ready to pick. Anyone who isn't color blind knows when a chili pod is ripe, but Mexicans are still the best workers in chili fields.

When he had made up his mind that this was the spot, Brockman called on the Elfrida postmaster.

"Do you know anyone who'd be interested in planting a few acres of chili?" he asked.

"For cash?"

"Yes, for cash," replied Brockman.

The postmaster took his feet off his desk and went into action.

"Just a minute and I'll lock up the place and take you around," he said. "It won't take long. There are only seventeen people living here."

The first farmer they talked to was a Doubting Thomas.

"No," he said emphatically, "I won't plant no more chili. I couldn't sell what I raised last year and most of it is still in the barn."

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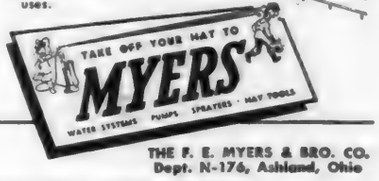

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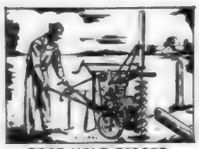
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"I'll buy it," Brockman countered, reaching for his wallet.

That did it. He lined up three farmers who were willing to plant a few acres of his seed. First he bought whatever was unsold from last year's crop, gave explicit instructions about planting and handling his seed, and signed a contract to buy every pepper pod they raised at an agreed upon price.

One of the three farmers lived in a house made of railroad ties which bulged with his own and his son's family. It had a mud floor and a mud roof.

"Why plant chili peppers," the man asked Brockman dispiritedly, "when you can't sell 'em?"

"You don't have to sell them. I'm buying them. I'll make a down payment on a five-acre crop right now." Again he reached for his wallet.

"Hitch up the horse!" the farmer called out to his son. "We're going to get ground ready for chili."

The first year this father and son set out five acres with plants produced under glass from seed supplied by Brockman. They cleared $1500. Today they have two big houses, free and clear. They plant fifty acres of chili each year. You can live pretty well if you grow fifty acres of a fool-proof crop like chili peppers contracted for at a good price before you set out a plant. You can just about count your pepper crop before it ripens. It takes 7000 plants to an acre; each plant produces about 35 ripe pods. Every chili pepper plant set out in this section, unless you hit it on the head or refuse to remove tomato bugs, will grow up and produce a pound of chili powder.

A dehydrating plant, grinding mill and packing equipment were installed in Elfrida, and the cash income of local farmers began to climb. The word got around. An old man, nearly blind, was trying to meet payments on two houses in Douglas so he and his wife could have an income when he could no longer see at all. He called on Brockman.

"I can't even pay my grocery bill," he told him, "much less keep up payments on my house. Do you suppose I could try my hand at chili farming for you?"

Brockman leased him five acres. He also paid his grocery bill and past-due mortgage payments, and advanced the old man a little cash to live on until his first crop

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, ETC. OF THE FARM QUARTERLY

Published quarterly at Cincinnati, Ohio, for October 1, 1948. Required by the Act of Congress, August 24, 1912, March 3, 1933, and July 2, 1946.

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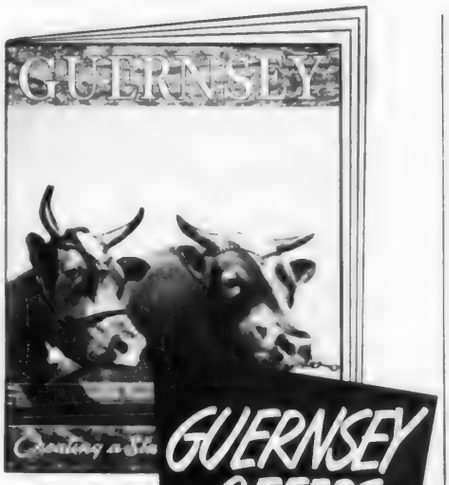
(Signed) Aron M. Mathieu, Business Manager.

(Signed) Clifford Laemmle, Notary Public. My commission expires October 5, 1948.



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matured. When it did the man repaid Brockman, and then asked if he'd loan him a thousand dollars as down payment on a five-thousand-dollar farm near Elfrida. Next harvest he repaid the thousand. The fourth year he paid out his farm and the two houses in Douglas. The fifth year he got $10,000 for his chili pepper crop. sold his Elfrida farm for $15,000, and retired to Douglas. He lives in one of his houses and rents the other one. At last he could afford an operation. Doctors removed cataracts from both eyes. While his eyesight is far from perfect it's good enough for him to knock the block off anyone who even hints that Brockman isn't king of more than Arizona's new chili pepper industry.

When the war was over, Brockman's firm no longer wanted to operate the Elfrida plant. He resigned from the company and bought them out, and since bought another plant at nearby Safford, built for dehydrating onions during the war. This plant has been moved to Elfrida to help take care of the constantly increasing chili crop. Brockman owns and plants 300 acres of his own and contracts with local farmers for their crops of from five to fifty acres planted with his two varieties of chili pepper.

It doesn't take a C.P.A. to estimate the profit on a field of chili once it is at the harvesting stage. Brockman pays $60 per ton for wet peppers as they come out of the field. The average yield is six tons per acre; some good plantings go as high as 14 tons per acre. The cost of producing one acre averages $105, which includes everything, even a good price for the grower's own labor.

From Seed To Harvest

Seeds are sown in hotbeds in February and the plants grow under cover until mid-April when they are taken out and reset in the fields. The plants are set 18 inches apart in 36 inch rows. Brockman's plant supply operation makes use of 22 hotbeds each 12 by 60 feet. Eight pounds of seed are sown in each bed.

The fields are irrigated each day for a week after the plants are reset and then cultivation starts. From then on there is one irrigation and one cultivation each week until harvest. Fertilizer is side dressed in June when the plants are small and liquid fertilizer is used later in the season when the first crop of green peppers are picked for canning.

Plants cost the grower about $5.00 per thousand. A Mexican laborer will set out half an acre a day, working a ten hour day at 50 cents an hour. Fertilizer costs about $20.00 per acre, water costs $5.00, cultivation $10.00, and picking $50.00 for a normal crop of 10,000 pounds.

Some growers put in a crop of alfalfa every three years, but others plant chili year after year on the same land. A rotation with alfalfa produces the best chilies.

Most of the laborers are Mexicans. They are available, they like the work, they are

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not too unhappy in the hot sun, and they suffer no skin trouble from the peppers. Fair skinned people sometimes get a rash.

The Harvest

By mid-August green pepper harvesting begins. These are washed and sorted and sent as wet chili by truckloads leaving Elfrida every other day for Phoenix where they are canned and frozen.

But green peppers are small change in the chili business. It takes a field of ripe red chili peppers to provide folding money and real color. Come September, and for ten miles in every direction from Elfrida the red fields make the highly touted Arizona sunset look like something designed for a nursery wall.

Red pods are picked and brought to the plant in trucks. They are spread in the sun until there's room for them in the dehydrating tunnels which work night and day. Arizona sunshine half-dries the chilies in a few days. They are then put into big washing machines and come out dust-free. Trays of the clean chilies are stacked on dollies and sent into the dehydrating tunnels for 13 hours at 165 degrees. For every hundred pounds entering the tunnels twenty pounds of dry chilies come out at the other end.

These are dumped on moving belts and sorted. About half are perfect and whole. These are the cream of the crop and are given a five-minute steam bath and sent out into the world on their own. Many firms as well as individuals prefer to do their own grinding and blending. They buy these whole pods in forty pound containers or in 180 pound bales. The market price is twenty to fifty cents per pound, depending on blend and quality.

Broken chilies, stems and pieces go into the grinding room to be made into chili pepper. This is blended for color as carefully as any face powder. Blending is done by paddles which at varying speeds produce varying heat. In chili powder mixing as well as in child disciplining, the faster the paddles go, the more heat—and the redder the result.

Chili pepper ground and mixed to exact specifications for color and degree of mildness is either put into a customer's own labeled containers or shipped to him for packaging. Brockman has been so busy trying to fill orders for the industry (spice, canning, frozen food companies, and meat-product manufacturers) that he hasn't perfected a distinctive blend to bear his own label. There's not much doubt that he'll get around to this soon. He's at the "I-wonder-what-would-make-a-good-name" stage now.

There's no waste in chili processing, which is handy for profits. Pods are machine-seeded to produce a mild powder—but the seeds go on to a busy life of their own. First they are relieved of their oil, which is used to lighten the color of some of the chili powder. Then the seeds are sold to chicken feed producers. An egg-laying mash to which some chili seed has

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been judiciously added is said to send egg production sky-high. Too much of it, however, not only makes hens unhappy, but shows up in the scrambled eggs. And chili pepper is not recommended as a substitute for grass for beef cattle. One of Brockman's steers over-indulged in dried peppers in the plant yard. When butchered the beef was so hot that even in the chili pepper capital nobody could eat it.

Pepper Boom

Elfrida's population has grown from seventeen to more than a hundred and is still growing; they've just voted a bond issue for a new high school. There are two grocery stores now, instead of one; their business is "mostly cash"—not like the old days. Transportation is no longer limited to catching a ride in a neighbor's beat-up truck. Julio Ramirez, who used to think he was lucky to stay out of debt, bought a $2200 Buick for cash the second year he planted chili. Of course Julio can't drive. But he has a big family and one of his sons or grandsons is always "running into town," so Julio goes into Douglas any time he wants to. Julio is a smart man when it comes to chili. He has been known to gross a thousand dollars on a single acre of chili plants. That's about three times the average return.

As for what Brockman makes on his 300 acres and from handling the total crop from 1200 acres, that's between him and the Collector of Internal Revenue. It's enough to make him known throughout the Southwest as the Chili King.

"That's the title newspapermen have given me," he says grinning. "'Round here they call me 'Hot Stuff'."

BIG CORN

(Continued from page 87)

that the soil is continually on the point of starvation.

In mid-November of 1946 four tons of manure per acre had been applied as a top dressing for the alfalfa. On December 6, 1946, he plowed the field, turning the alfalfa sod and leaving it during the winter to hold the rainfall. As he plowed, he used a fertilizer attachment to place under the plow sole, 720 pounds per acre of 4-8-8 fertilizer on the four acres, putting it down about ten inches. July sometimes is a very dry month in east Tennessee, and the object in placing the 4-8-8 deep was to allow available moisture to work on the fertilizer, turning it into plant food which the corn could utilize at a time when the first three or four inches of top soil might be bone dry.

In addition, and despite the recommendations of the University Extension men, Smith mixed with his 4-8-8, 75 pounds of cyanimide per acre. The professors said that it was a useless gesture, that it merely added $2.25 per acre to the cost of his fertilizer without contributing any-

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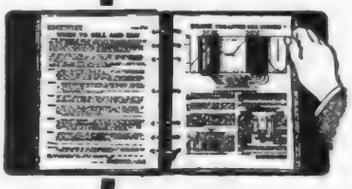

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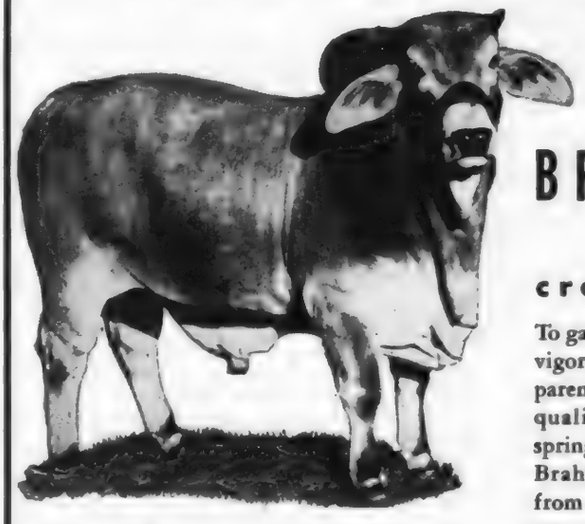

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thing to the support of the corn. Smith is not yet convinced that they are right. At any rate, the corn showed no signs of a nitrate deficiency. As Smith puts it, "The cyanimide was just extra insurance. I'd rather have it and not need it, than need it and not have it."

On April 25, 1947, the plowed field was cross-disced. April 28th was selected as the planting date, and on the morning of that day the field was worked again, lightly, with a Seaman tiller and a rough plank drag. As the corn was planted, an additional dose of 200 pounds of 4-8-8 (highest potash available at the time) was placed in the row.

Although Smith has two tractors and is hoping to find another one this year, he believes that no farmer can do his best farming without a team of horses. For corn planting he uses a two-horse, two-row planter. This method, he says, gives straighter rows, plus greater ease of operation than does a tractor-drawn planter. He contends that too much effort and space is wasted in trying to turn a tractor in small fields, but admits this might not be true for large fields.

The corn planted was Dixie 17, a hybrid developed in the cooperative corn breeding program of the Southeastern States and the U. S. Department of Agriculture. This hybrid has consistently outyielded other commercial hybrids in official tests in Tennessee and the northern parts of the states to the South.

With the slide rule he had figured that 10,000 plants per acre, under proper conditions, would give him 125 bushels of corn per acre. He set his planter to drop one seed each 14½ inches, potentially 10,800 stalks per acre. His rows were placed 40 inches apart to allow ample sunight to penetrate between the rows.

On May 19th, the corn was harrowed. Smith set a young field hand on the job. The lad fell to dreaming about his Saturday night date and some 2,000 plants per acre were pulled out. Although the alfalfa sod had been thoroughly disced, not all the long roots had been cut, and the harrow teeth snagged many of them, pulling up the young tender corn among the alfalfa roots.

On June 6th the corn was plowed with a 21-tooth cultivator, horse-drawn. The next day, June 7th, there was rain. Allowing time for the ground to dry, a disc cultivator was used on the corn on June 13th, throwing the dirt away from the stalks.

On June 17th when the corn was about knee high, a side dressing of 185 pounds of ammonium nitrate per acre was furrowed between the rows. On June 18th, the disc cultivator again was used to throw the dirt back to the corn. This was the final cultivation, although hand hoes were used regularly during the summer to chop out the morning glories, which took advantage of the banquet of fertilizer and grew like Jack's beanstalk.

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At this time an actual count of matured stalks of corn showed 7,997 per acre, a loss of more than 2,000. A small part of this was due to non-germination, but the greater loss came through carelessness on the part of the young man who harrowed the corn in May.

Smith is a firm believer in the value of corn suckers. Most of his corn had two suckers per stalk, and many of the suckers produced two ears of corn. As he says, a sucker will grow just as far as there is plant food in the soil to nourish it. He believes the suckers replaced some of the early loss of corn plants through careless cultivation.

The experiment station professors say that suckers do not retard the corn, but that pulling them out or cutting them off does damage the corn to some extent. Simple artihmetic convinced Smith that the time and labor expended in pulling suckers could not be made up unless the yields were increased considerably by the pulling, so he let the suckers stand.

The weather man cooperated all through the season. There was a fairly substantial rain in July at a time when rain was badly needed. It was a spot shower and missed neighboring farms. He estimates that of the average 48-inch rainfall in east Tennessee, roughly three-fourths fell just at the right time of plowing and during the growing season of the corn. This amount approximates the 36 inches of water needed to grow 150 bushels of corn per acre, since 12 inches are needed for every 50 bushels produced.

The corn developed deep, wide root systems and continued lush and green through August and into September.

On October 22nd it was harvested, weighed, and measured under the supervision of F. D. Richey, head agronomist of the U. S. D. A. Tennessee station. His report, boiled down, was as follows: "Four acres hybrid Dixie 17 on the Wayne Smith farm was harvested on October 22, 1947. The acre yield was 148.7 bushels of No. 2 corn. The moisture content at harvest was 18.6 per cent, but the 148.7 bushel yield was based on a 15.5 per cent moisture content. There were 178 ears per hundred stalks. Many stalks had three ears, some had four. The stand was 7,997 stalks per acre."

Dixie 17 produces a short stubby ear of corn, which, while well covered by the shucks, is not a thing of beauty in corn circles, but the weight was there.

A soil analysis made after the corn was harvested showed no change in the acidity. Available phosphate was rated medium, a distinct improvement over the "very low" rating before the fertilizer was applied. Potash was low, but still present in greater quantities than the year before, despite the heavy demands of the corn.

Smith began his experiment with the idea of cuting down labor by growing more corn on less acreage, a plausible reason for any farmer. He succeeded in growing more corn per acre than any

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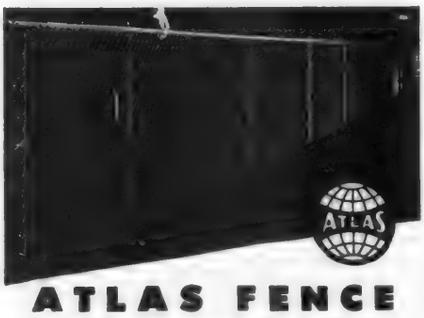

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other farmer of record in Tennessee. He did not approach the records set by some experiment stations in the South, but he demonstrated that a farmer can grow record crops under farm conditions. The Virginia Experiment Station, growing Dixie 17, raised 194 bushels of corn per acre, but this was done under irrigation. Smith's water supply does not permit irrigation.

Dr. Eric Winters, head agronomist at the University of Tennessee, says that Smith has reached his maximum production unless he irrigates, since virtually all the available supply of water was used last year in growing 148.7 bushels per acre. Smith isn't from Missouri, but he likes to be shown, and he isn't so certain that Dr. Winters' theory is right. At least he started the new year of 1948 with a resolution to better his 1947 record, setting as his goal a per acre yield of 160 bushels.

He used three of the four acres which he had in corn the previous year, but he increased both the amounts of commercial fertilizer and manure per acre.

He applied 12 tons of manure per acre, instead of the four which he used last year. He again put his commercial fertilizer under the plow sole, but this year he used 800 pounds, an increase of 80 pounds per acre over last year, and he was able to secure a plentiful supply of 0-12-12, which should correct the potash deficiency.

He applied 200 pounds of 5-10-5 in the corn rows and side dressed with 300 pounds of ammonium nitrate per acre, instead of the 185 pounds he used in 1947. The side dressing was done at one time, as it was last year.

He planted the grains 13 inches apart in rows spaced 40 inches. This is an initial planting of 12,000 stalks per acre. He estimates this should allow ample margin for the 10,000 plants he wants. His goal this year is 160 bushels per acre, and secretly, he is hoping for 175.

The news of Smith's big corn crop trickled to every crossroads grocery store and farm in the county. Doubting Thomases dropped in on Sunday to see him and to ask sly questions about his secret. "If Wayne Smith can do it on that thin land of his, I can do it," they said, and went home to plan their next year's crop. "Smith's Treatment" was catching and spread around the county like an epidemic of measles. He was quoted everywhere, "Give your land plenty of manure, put down enough fertilizer to produce 150 bushels per acre, and if the weather is decent, you'll take off a big crop."

One of the commonest statements heard when Smith's crop is discussed is that a 150 bushel yield on Tennessee land is possible only by putting out so much extra labor and extra money that the farmer is in the red at the end. Smith's account books refute this misconception for he is a meticulous record keeper and knows to a penny what his crop cost him.

His records show that in 1946 his aver-

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age corn yield was 72 bushels per acre. To produce that yield he spent $10.50 per acre for fertilizer. 'I was applying just enough fertilizer to kill the earth worms, but not enough to replace the plant food the crops were taking from the soil," he says.

In 1947, for his big crop, he spent $25.58 for fertilizer. This was an increase of $15.08 per acre over the year before. With the additional fertilizer his crop jumped from 72 bushels per acre to 148.7 bushels, an increase of more than 100 per cent.

The 76.7 extra bushels per acre cost him $15.08 more for fertilizer. With corn selling at that time at $2.25 per bushel, his increase was $172.57 more per acre than the year before. Here is his breakdown on labor costs:

Original sod plowing	$ 35.00
Finishing seedbed and planting	35.00
Side dressing and cultivation	35.00
Cutting out morning glories.... (Three hand cuttings)	82.50
Hand cutting and shocking....	35.00
Pulling ears	65.00
Hauling and unloading at barn	12.00
Shredding corn stalks (note below)	80.00
Total cost for 4 acres, 600 bushels	379.50
Per acre cost	94.87½
Per bushel cost	.63
Profit over labor costs on $2.25 corn	1.62

Included in total labor cost (but not included in the profits) of corn is the time for shredding the corn stalks, which most farmers would not include. Smith thinks that the stover is better for bedding than straw. He says it absorbs more moisture, and because it holds urine better, he returns more plant food to his soil when he spreads the manure. He estimates the shredded corn, which cost him $80.00, to be worth $200.00.

Adding the cost of fertilizer, seed corn, grinding, interest on machinery and land investment to the cost of labor, Smith figures that his corn cost him $1.50 per bushel in the feed trough ready for the cows to fall to.

Charged against the extra profit was five hours labor applying the extra fertilizer. However, the five hours were made up many times by the labor saved in the three acres of corn NOT planted. Actually, the labor costs for producing 500 bushels in 1947 was much less than the costs for producing the same amount in 1946. Farmers will find this an important and convincing argument for growing the same amount of corn on less acreage—labor is cut in proportion to the increase in yield.

Some farmers will say, "Smith can double his yield on a small field, but I can't double the yield on my 80 acre field." Smith has an answer for that too. "There is no reason why my way of producing a big crop can't be used regardless of the

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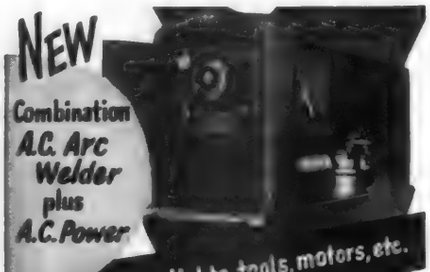

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size of the field. In fact, it will take less work and less expense, even if you add the extra cost of fertilizer.. I found that for every extra dollar I spent on fertilizer I got back $5.00 in corn."

He does admit that manure played an important part in his success. His dairy barn supplies ample manure for his small acreage, but he points out that usually the larger the farm the more manure available.

Smith can be lyrical when he talks about manure, both the green and the stable variety. "It takes the place of a cover crop—not as good as a cover crop, in my opinion, but the next best thing. Because of my small fields, and the fact that I can't follow my corn with clover or rye, and still raise corn the next year, I must depend on manure. If I could do what I'd like, I'd put in a cover crop, manure it heavily, and depend on the cover crop to provide plant food for my corn. But when you harvest corn in November, you can't put in a cover crop and still have corn in the same ground the next year."

But he thinks that you can't overestimate the importance of manure. He says firmly that he couldn't continue to raise corn year after year, in the same ground, without it.

He spreads his manure fresh from the barn, and when pressure of work will permit, he turns it under as soon as it is spread. He says that because of the peculiar nature of his soil, fresh cow manure has a tendency to make the soil tight, but that by applying the manure every day, the gradual decomposition counteracts that tendency and gives him greater plant food than if he piled his manure and spread it all at one time.

He calculates the amount of plant food the manure will supply by using a chart worked out by the University of Tennessee. Each ton of fresh manure gives him 10 pounds of nitrates, five pounds of P_2O_5, or phosphates, and 10 pounds of K_2O, or potash. And in figuring the amount of plant food his corn will need, he takes into consideration the manure. As he puts it, "The manure is a valuable by-product which costs nothing. The equivalent in fertilizer not only costs money, but wouldn't supply humus."

Smith also likes earthworms, and not alone because he likes to fish. He believes they help the soil tilth and help to increase the availability of plant food. He says his heavy applications of manure help the earthworms and offsets the phosphoric acid, which kills the worms.

"How about the weather?" he was asked.

"That is a horse of another feather," he said. " You have to have the weather man with you. Every farmer gambles a little bit, and depends heavily on the Lord playing on his team in the pinches. You might as well be ready to profit in case he is on your side."

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FATHER'S RIGHT-HAND MAN

(Continued from page 74)

was consummated. There, before my very eyes, an egg pipped, bit by bit the shell dropped away, and the hole grew larger and larger. Then, with strength unbelievable in such a little fellow, a wet baby chick pushed his way out, and lay panting and gasping from his struggle. After a few minutes' rest, he'd come scrambling over the other eggs toward the light, and down he'd go through the open strip in the tray. This landed him in the space below called the nursery, where he'd dry off and grow fluffy. Each one invariably made his way toward the light of the glass panel, and joined his fluffy friends below. By night the hatch was over, and the nursery full of lively, chirping chicks.

Upstairs in the brooder house we had their new home ready. Windows ran all along the south side; built out from these windows at the sill was a wooden platform about a yard wide, surrounded by a miniature wire fence. This platform was covered with dry sand, and a small door of the brooder opened upon it. It was like a sunny playground, and the chicks were like children racing around it and cutting capers. It was fun watching them! It seems to me that later generations of children have missed a lot of happy experiences. In those days almost every family hatched a few chicks.

By the time the chicks were hatched it was spring. The apricot tree beside the driveway was sheathed in pink and white blossoms before any leaves appeared, and sometimes it bloomed even before the snow was entirely gone. The fruit never hung on long enough to ripen but that tree earned its right to live by contributing the first breath-taking beauty of spring.

In our back yard were strips of grassland in which were planted peach and pear trees. The land in between was plowed, and here Father planted his garden, and I had mine. When these trees were in bloom, and straight rows of tiny young plants etched green lines across the brown rectangles, with everything raked and made ship-shape, it really presented a colorful picture. I was inordinately proud of my part of it.

The Russet and the Pippin

Beyond the garden plot lay the apple orchard. There was a Red Astrahkan, a Russet, a Northern Spy, and a Tolman Sweet. Those four stood together. Then beyond were a few Baldwins. What a flood of childhood memories comes rushing back at the thought of those old trees; like kind old friends who have made life richer for having known them. The Baldwins had low crotches which made comfortable laps in which to sit on hot summer afternoons and daydream. I spent hours there, building air castles. The Astrahkan tree bore early, and I often carried a knarly, prematurely ripened drop around in my pocket, just to smell its spicy aroma. My favorite was the Northern Spy. Now there was a tree, with its wide, generous arms spreading low to the ground. And it bore its fruit, firm, tart, and juicy, right down on those low branches where a small girl could reach it. All through October when I'd come home from school, always hungry, I reached the back door by way of the Northern Spy tree. Show me a Northern Spy today, and I'm back under that old tree, sinking my teeth into crisp, fragrant apples. I remember the Russet, too. No earthly good until after Christmas; then they were excellent with a tender skin and rich creamy flesh with an unforgettable flavor.

It was on one of the high limbs of the Russet tree that Father put my swing. With someone to push and run under, it carried me as high as the treetop. It tied my stomach up in knots, and sometimes made me quite sick and dizzy. Then Father would dig up a spadeful of earth and make me lean down close to it and take long deep breaths. The clean smell of the cool, moist earth cured my sickness every time, I don't know how or why.

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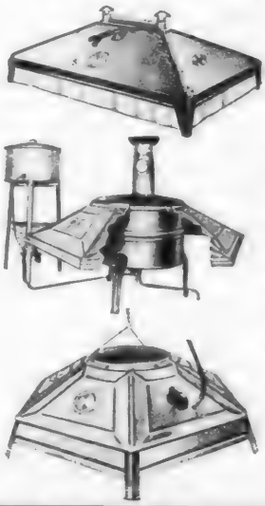

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It might be that my Father's strange cure had something more than my childish faith in its favor.

Many evenings I came out after supper and sat in the swing, enjoying the cool air, laden with the scent from the clover field. The golden sunlight lay on the house and barn, and the pasture fence held the usual king birds, who came there every evening to survey their world, even as I was doing.

Forest Lore

The pasture was at its best in the spring. Close cropped by the cows, it felt like a carpet under bare feet, and it stretched on and on invitingly. There actually were about thirty acres of it, including pine groves, bogs, swamps, sand pits, and woods. Here in the early spring we gathered wild flowers. Father taught me their names long before I went to school. Some of the names he gave them were different from ones I later learned, but I thought his were prettier. He called anemonies, snow drops; and the wild iris that blooms in the swamps in June, he called blue flags. We gathered great bunches of the golden marsh marigold, or cowslip. Then we carried a basket for the tender leaves and buds which we took home to be cooked. Their flavor was very similar to dandelions.

The edge of the pine grove was frosted with false soloman seal, and I knew the sunny slope where the first ladies slippers bloomed. There was a brook in which we gathered watercress, so early in spring my feet became numb in the icy water. The warm sunshine intensified the fragrance of the wild azalea bloom, and I gathered lamb kill, adder's tongue, meadow rue, turtle head, and many others.

All through my childhood I never tired of roaming the pasture land. From the time the red maple keyes colored the swamps in the spring, through the hot hazy summer, 'til I gathered Christmas greens in the winter woods, I knew it intimately. Once in a densely wooded section of our swamp I came upon some beautiful wild orchids. Pure white, the flowers were made up of a cluster of flowerets each with a beautifully fringed lower lip. And, I remember coming suddenly upon a clearing aglow with the bright tangerine colored squaw weed. I've seen an old tumbled down wall covered with a mosaic of wild vines, a landscape gardener's envy; little wild plants among rocks, making a natural rock garden; and ferns growing in beautiful array beside an old cart path. Little things perhaps, but a wise father pointed them out, and taught me to see and enjoy them, a store of lovely pictures to be reviewed and enjoyed again and again at will. They make an infallible insurance against a world which seems too much with us.

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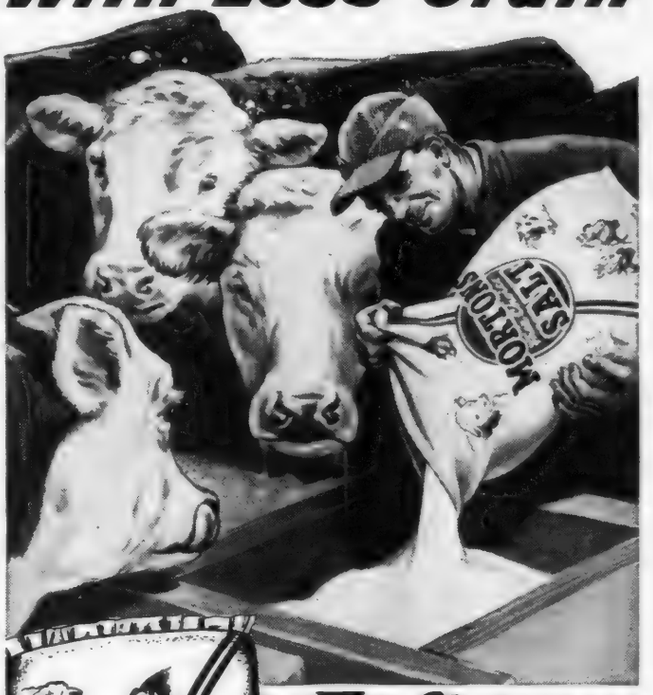

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FARM BOOKS

(Continued from page 20)

As this change was taking place the science of farm management was born. One of the pioneers in this new field was the late Dr. Andrew Boss, Professor of Agriculture and Farm Management at the University of Minnesota. Just before his death Dr. Boss, with his associate, Dr. George A. Pond, finished his last work on this subject, "Modern Farm Management."

In this book the authors take up the familiar problems of the farmer such as seedbed preparation, crop rotation, livestock breeding and study them from the economic and managerial point of view. As an example of farm management at work they illustrate their theoretical material by applying the rules of management to a 160 acre dairy farm. They show the mapping of the farm, the soil maps, the checks that were used to determine the present productiveness of the farm and an analysis of the relation of crops and animals to income and the methods used to plan long range improvements.

The authors have devoted considerable space to such important matters as farm records, legal matters relating to farm business, the use of capital and credit in farming, and work simplification studies. As in the other sections they have used practical illustrations for their text such as cash books, inventories, model agreements, mortgages and promissory notes to make the book more understandable.

Handbooks

"The Farmer's Handbook" by John M. White and the "Poultry Handbook" by Rudolph Seiden are excellent examples of a number of new reference books for the farmer. The "Poultry Handbook" is an encyclopedia of information arranged alphabetically, covering the various breeds. the care, diseases, feeds and housing of poultry. The entries vary from one line definitions and references to several page articles on such practical subjects as feed formulas or the common diseases.

The "Farmer's Handbook" is arranged to cover the various classes of crops such as grains, legumes and grasses, fiber and oil crops and the like with a careful description of each variety and a discussion of its production and uses. Livestock is broken down into classes and breeds in much the same fashion with individual sections on care, feeding, diseases and marketing. There are also sections on soil conservation and farm engineering and a miscellaneous section with such odd practical bits of information as how to fill a sack without someone holding it, or the best method to use in storing ice from the farm pond.

The Farm Book Store

The Editors of the Farm Quarterly, after a careful selection of current agricultural books, recommend the following to our readers.

Soil and Crops

Soils and Fertilizers—*by Firman E. Bear*.....$3.75
An understandable book on the complex subject of fertility.

Farmers of 40 Centuries—*by F. H. King*.....$5.00
One of the great books on soil utilization and fertility.

Using and Managing Soils—*by A. F. Gustafson*.....$2.80
Fertility, rotation, drainage, erosion, tillage are covered.

Elements of Soil Conservation—*by H. H. Bennett*.....$3.20
The problems of erosion and exhaustion of soils by an authority.

Production of Field Crops—*by Hutcheson, Wolfe & Kipps*....$4.50
A new edition makes this the latest work on American field crops.

Vegetable Crops—*by Homer C. Thompson*.....$6.00
The science of producing and handling vegetable crops.

Weeds—*by W. C. Muenscher*.....$6.00
The identification and control of these soil bandits.

Farm Management

Modern Farm Management—*by Andrew Boss & G. A. Pond*..$5.00
A review of this book may be found in the Farm Books column.

Farming for Profit—*by H. R. Herndon*.....$3.75
The business of farming from choosing a farm to selling the produce.

The Squires Can Take It—*by Ladd Haystead*.....$3.50
A witty review of farming by the one-man Department of Agriculture.

Success on the Small Farm—*by Haydn S. Pearson*.....$2.50
Subject—how to net $3,000 a year on 10 to 12 acres.

The Farmer's Handbook—*by John M. White*.....$4.95
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New Riches From the Soil—*by Wheeler McMillen*.....$3.50
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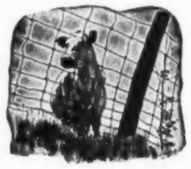

Livestock

Feeds and Feeding (21st ed.)—*by F. B. Morrison*.....$7.00
A review of this book may be found in the Farm Books column.

Dairy Science—*by W. E. Petersen*.....$5.00
680 pages of the best modern dairying practices.

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Beef Cattle—*by Roscoe R. Snapp*.....$5.00
A carefully revised edition of this excellent book on beef production.

Poultry Handbook—*by Rudolph Seiden*.....$6.00
A review of this book may be found in the Farm Books column.

Successful Poultry Management—*by M. A. Jull*.....$3.50
A practical book on poultry from brooding to marketing.

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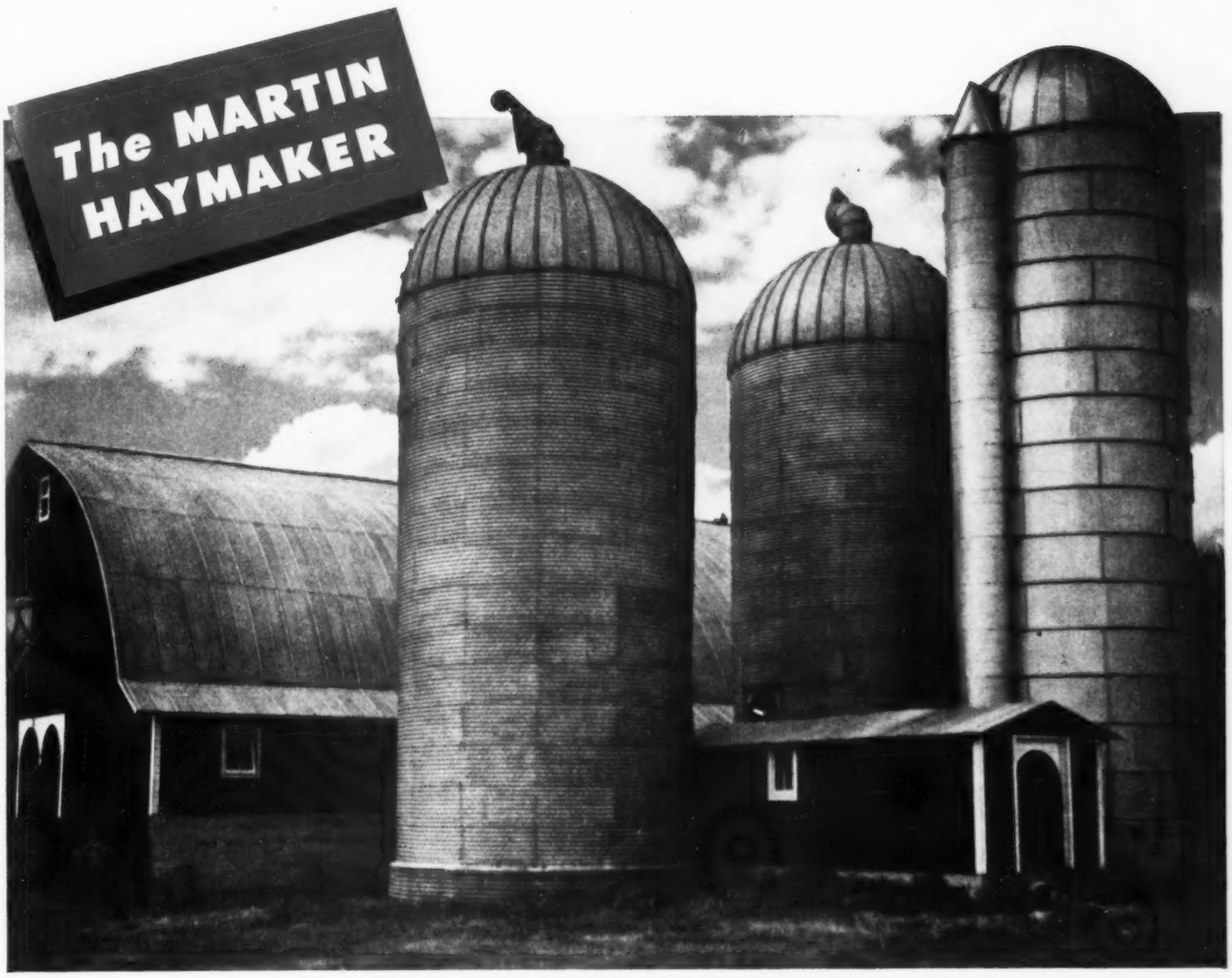

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103 LONGVIEW AVENUE, MANSFIELD, OHIO

PIONEERS in the Design and Fabrication of METAL Buildings EXCLUSIVELY for the Farm

Neighborly NEIGHBORHOOD MM SERVICE

MINNEAPOLIS-MOLINE MODERN MACHINERY

Minneapolis-Moline maintains nine large division offices to promptly serve the thousands of MM Dealers and Distributors who in turn serve MM owners with skilled MM mechanics and genuine MM replacement parts.

The MM trade-mark, a symbol of long-life economy and dependability, identifies your neighborhood MM Dealer . . . a vital link in an organization serving agricultural America. And agriculture is the basis of our economic security and our American system of free enterprise.

DIVISION HEADQUARTERS

- ★Northern Division — Hopkins, Minnesota
- ★Northwestern Division — Fargo, North Dakota
- ★Eastern Division — Columbus, Ohio
- ★Southern Division — Memphis, Tennessee
- ★Central Division — Peoria, Illinois
- ★Pacific Division — Stockton, California
- ★Midwestern Division — Omaha, Nebraska
- ★Southwestern Division — Kansas City, Kansas
- ★Texas Division — Dallas, Texas
- • MM Dealers

DISTRIBUTORS HEADQUARTERS

- ○ Frick Company, Inc. — Waynesboro, Pennsylvania
- ○ General Mills, Inc. — Farm Service Division — Waltham, Massachusetts
- ○ Hamilton Equipment Co. — Salt Lake City 1, Utah
- ○ Missoula Mercantile Co. — Missoula, Montana
- ○ Reed Hardware & Implement Co. — Idaho Falls, Idaho
- ○ The Sawtooth Company — Twin Falls, Idaho
- ○ Distributor-Dealers

Throughout the land, there's a MM Dealer close at hand!

MINNEAPOLIS-MOLINE gives its skilled engineering the continuous and aggressive support of a parts distribution and service system that blankets agricultural America! Delays in obtaining genuine MM replacement parts or extra equipment are thereby practically eliminated, as is the necessity of substituting inferior parts that fall far short of MM quality. Minneapolis-Moline knows that the usefulness of even MM *QUALITY* MODERN MACHINES, VISIONLINED TRACTORS and POWER UNITS may be lost due to accident or misuse.

MM Divisions and branch warehouses and thousands of MM Dealers and Distributors are strategically located to serve *you* quickly and economically. When you buy MM MODERN MACHINERY that's BUILT TO DO THE JOB, you buy positive assurance of immediate, aggressive "follow through" by your neighborly neighborhood MM Dealer . . . a *friendly* dealer equipped with skilled MM mechanics and genuine MM parts for *all* MM equipment. *And MM owners know that there is no substitute for the in-built quality and economy that has made MM the choice of progressive farmers everywhere.*

Remember, your MM Dealer is your neighborly neighbor—ready, willing and able to assist you in maintaining your MM equipment at peak performance. And that's tops!

Get Complete Facts on *Quality* MM MODERN MACHINES, VISIONLINED TRACTORS and POWER UNITS From Your Friendly MM Dealer

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